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For related information see also *Astronautics*.

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Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **1450**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **1452**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **1453**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **1453**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

GENERAL

99 GENERAL **1455**

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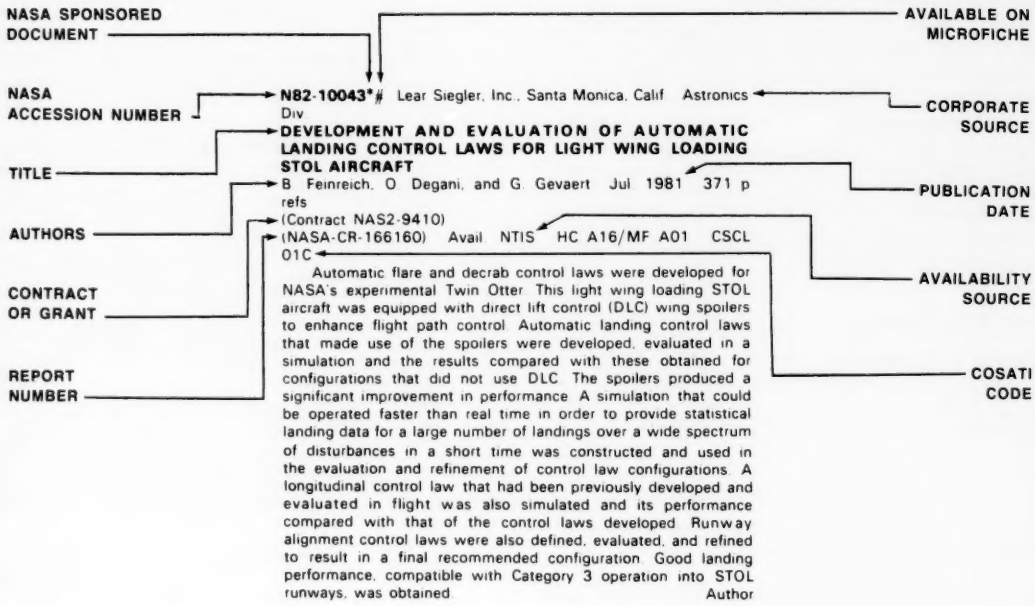
TYPICAL CITATION AND ABSTRACT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NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div
CORPORATE SOURCE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
TITLE
PUBLICATION DATE
B. Feinreich, O. Degani, and G. Gevaert Jul. 1981 371 p refs
AUTHORS
(Contract NAS2-9410)
(NASA-CR-166160) Avail. NTIS HC A16/MF A01 CSCL 01C
CONTRACT OR GRANT
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 10/MAY 23, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-19131* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 143)
Jan. 1982 85 p
(NASA-SP-7037(143)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 254 reports, articles, and other documents introduced into the NASA scientific and technical information system in December 1981. A.R.H.

N82-19132*# National Aeronautics and Space Administration, Washington, D. C.
BIBLIOGRAPHY OF NASA PUBLISHED REPORTS ON GENERAL AVIATION, 1975 TO 1981
Jun. 1981 277 p
(NASA-TM-83307) Avail: NTIS HC A13/MF A01 CSCL 01B

This bibliography lists 478 documents which relate to all heavier-than-air fixed wing aircraft exclusive of military types and those used for commercial air transport. An exception is the inclusion of commuter transport aircraft types within the general aviation category. NASA publications included in this bibliography are: conference publications (CP), reference publications (RP), technical memorandums (TM, TMX), technical notes (TN), technical papers (TP), and contractor reports (CR). In addition, papers and articles on NASA general aviation programs published by technical societies (AIAA, SAE, etc.) are included, as well as those listed in NASA's Scientific and Technical Aerospace Reports (STAR) Journal. Author and subject indexes are also provided to facilitate use of the bibliography. T.M.

N82-19133*# Oklahoma Univ., Norman. School of Aerospace Mechanical and Nuclear Engineering.
AN EXPERIMENTAL INVESTIGATION OF FLOW SURROUNDING AN AIRFOIL WITH A JET EXHAUSTING FROM THE LOWER SURFACE Final Report
A. Krothapalli and D. Leopold Jan. 1982 58 p refs
(Grant NsG-2111)
(NASA-CR-166131) Avail: NTIS HC A04/MF A01 CSCL 01A

The aerodynamics of an airfoil with a rectangular jet issuing from the lower surface at seventy percent of the chord, with and without a ground plane was studied. Measurements include surface pressure on the airfoil and the total pressure profiles in the near wake. These measurements were made at jet to free stream velocity ratios ranging from 0.5 to 5.0. The measurements indicated a significant positive and negative pressure regions on the lower surface of the airfoil ahead and after the nozzle exit respectively. The extent and intensity of these regions increase with increase in velocity ratio for the range covered here. The upper surface pressure distribution with velocity ratio show no significant variation. The presence of the ground plane, for height h, greater than one chord seem to have little influence on the overall pressure distribution of the airfoil. The airfoil wake centerline moves up with velocity ratio as compared to that of the free airfoil (without the jet). B.W.

N82-19134*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS
Nelson J. Groom, ed. and Ray V. Hood, ed. Feb. 1982 269 p Proceedings of workshop held in Hampton, Va., 9-10 Jun. 1981
(NASA-CP-2209; L-14965) Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating presentations on the development of electric flight systems for the all-electric aircraft and for spacecraft are presented. For individual titles, see N82-19135 through N82-19150.

N82-19135*# Lockheed-California Co., Burbank.
ELECTRIC FLIGHT SYSTEMS, OVERVIEW **c08**
Michael J. Cronin *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 61-94 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric flight systems are presented. Fuel consumption, the power plant assembly, flight control technology, electromechanical actuator systems and components of possible power systems are surveyed. J.D.H.

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE **c07**
Robert P. Wagner *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 95-102 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on electric propulsion systems are presented. The electric engine and engine/generator configurations are described and NASA's role outlined. J.D.H.

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY AREAS FOR ALL-ELECTRIC AIRCRAFT **c07**
Thomas G. Lenox *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 103-112 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials illustrating a presentation on all-electric aircraft propulsion systems are presented. Propulsion system impacts on aircraft design and areas requiring further study are outlined. J.D.H.

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div.
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT **c07**

Alan E. King *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 113-124 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the all-electric aircraft power system are presented. The advantages of the system and the planning time table are outlined. J.D.H.

N82-19139*# Sundstrand Aviation-Rockford, Ill.
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS **c33**
Richard McClung *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 125-146 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

Materials illustrating a presentation on 400 Hz constant speed generation systems are presented. The system features are outlined, components and functioning described, and display graphics illustrated. J.D.H.

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS **c05**
Dale O. Moeller *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 147-154 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electric environmental control systems for electric flight systems are presented. Requirements are outlined and schematics presented. J.D.H.

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS **c05**
Fred M. Rosenbush *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 155-188 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on environment control systems for electric flight systems are presented. Schematics and flow diagrams of fresh air source and air conditioning systems, and vapor cycle and air cycle parts lists are presented. J.D.H.

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS **c05**
Charles Wyllie *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 163-187 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on electromechanical actuation programs (EMA) are presented. The development history is outlined. Space shuttle flight control systems and the advantages of EMAS, and EMA technology status and development requirements are outlined. J.D.H.

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.
DIGITAL FLIGHT CONTROLS **c08**
John C. Hall *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 189-212 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on digital flight controls for electric flight systems are presented. System architecture and design criteria are outlined, and components described. J.D.H.

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS **c33**
C. William Clay *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 213-234 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

Materials used to illustrate a presentation on the development of electric flight systems are presented. Systems concepts are outlined. J.D.H.

N82-19145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY **c07**
Anthony C. Hoffman *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 235-240 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

Materials used in a presentation on development of engine technology for electric flight systems are presented. Component and system technology issues, NASA's role, and flight test requirements are outlined. J.D.H.

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS **c05**
Robert Finke *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 241-246 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation of the development of power systems are presented. The technology issues and tradeoffs, the role of NASA, and testing requirements are outlined. J.D.H.

N82-19147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL CONTROL SYSTEMS **c54**
Frank Hrach *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 247-252 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 06K

Materials illustrating a presentation on environmental control systems for electric flight systems are presented. The major technology issues, major development and application steps, the role of NASA, and required flight testing are outlined. J.D.H.

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELECTROMECHANICAL ACTUATORS **c08**
James Bigham *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 253-258 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the development of electromechanical actuators (EMA) for electric flight systems are presented. Technology issues are identified, and major steps relative to EMA development, NASA's role, and a technology procurement plan are outlined. J.D.H.

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIGITAL FLIGHT CONTROLS **c08**
Billy Dove *In its* Elec. Flight Systems Feb. 1982 p 259-261 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating the presentation on digital flight controls are presented. Technology issues, the role of NASA, and steps in the development of flight controls are outlined. J.D.H.

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS INTEGRATION **c08**
Ray V. Hood *In its* Elec. Flight Systems Feb. 1982 p 263-268 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

Materials illustrating a presentation on the integration of components and subsystems of electric flight systems are presented. The technology issues are outlined, and near and far term implications of issues affecting the systems integration are outlined. J.D.H.

N82-19151*# Kentron International, Inc., Hampton, Va.
A COMPUTER PROGRAM FOR WING SUBSONIC AERODYNAMIC PERFORMANCE ESTIMATES INCLUDING ATTAINABLE THRUST AND VORTEX LIFT EFFECTS Interim Report
Harry W. Carlson and Kenneth B. Walkley Washington NASA Mar. 1982 62 p refs
(Contract NAS1-16000)
(NASA-CR-3515) Avail: NTIS HC A04/MF A01 CSCL 01B

Numerical methods incorporated into a computer program

to provide estimates of the subsonic aerodynamic performance of twisted and cambered wings of arbitrary planform with attainable thrust and vortex lift considerations are described. The computational system is based on a linearized theory lifting surface solution which provides a spanwise distribution of theoretical leading edge thrust in addition to the surface distribution of perturbation velocities. The approach used relies on a solution by iteration. The method also features a superposition of independent solutions for a cambered and twisted wing and a flat wing of the same planform to provide, at little additional expense, results for a large number of angles of attack or lift coefficients. A previously developed method is employed to assess the portion of the theoretical thrust actually attainable and the portion that is felt as a vortex normal force. B.W.

N82-19152# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

LA RECHERCHE AEROSPATIALE, BIMONTHLY BULLETIN NUMBER 1981-3, MAY - JUNE 1981

Claude Sevestre, ed. Paris ESA Oct. 1981 80 p refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 143-221 Sponsored by ESA

(ESA-TT-714) Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, PARIS FF 45

Advances in the aerospace industry are reviewed. Computation of vortex sheet rollup and transonic viscous flow are discussed. Topics also cover aircraft optimal control for gunnery, an algorithm for structural vibration mode calculation, aircraft antistatic protection testing, the modification of a transonic wind tunnel, and testing ventilated nozzle models. For individual titles, see N82-19153 through N82-19159.

N82-19153# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ROLLING UP OF VORTEX SHEETS FROM THE EDGES OF LIFTING SURFACES c02

R. Legendre *In its* La Rech. Aerospatiale Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 3-7 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, May-Jun. 1981" p 143-147 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Calculations of vortex sheets in three-dimensional unsteady flows of incompressible liquids are considered. The correct adaptation of calculations to the interpretation of experimental facts, relating to the transient periods preceding the establishment of permanent flows, is discussed. Several methods already available for calculating incompressible fluid flow around a lifting surface, causing the release of vortices, are criticised. An extension to subsonic flows is shown possible when Prandtl-Glavert linearization is justified by data pertinent to the problem.

Author (ESA)

N82-19154# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

MULTIVARIABLE AIRCRAFT CONTROL BY MANEUVER COMMANDS: AN APPLICATION TO AIR TO SURFACE GUNNERY c08

Binh DangVu *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 9-19 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 149-159 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Aircraft control where pilot commands are variables directly related to aircraft motion in opposition to deflection angles of control surfaces is described. Linear optimal control theory is applied so as to improve flight qualities and reduce the work load of the pilot. A control system for sideslip, rate of roll, and rate of pitch was tested in numerical simulation and its efficiency for aiming in air-to-surface gunnery was assessed. Results show that control of the rate of pitch is well adapted for cancelling longitudinal aiming devitions, but that control of yaw rate is preferable to roll for cancelling lateral deviations. Another system obtained by integrating the flight control and fire control systems is also suggested. Author (ESA)

N82-19155# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

STRONG MATCHING METHOD FOR COMPUTING TRANSONIC VISCOUS FLOWS INCLUDING WAKES AND SEPARATIONS: LIFTING AIRFOILS c02

J. C. LeBalleur *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 21-45 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 161-185 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A general method is presented for computing lifting two-dimensional steady viscous flows with wakes and possibly separations inside viscous layers. The method uses a transonic potential calculation, strongly interacting with a defect integral method giving the viscous correction to apply inside boundary layers, laminar or turbulent, or inside dissymmetrical wakes. The mathematical model for matching, the viscous model for averaged mean velocities with reverse flow and for turbulent closure in nonequilibrium layers, and the different numerical solution techniques are described. The numerical coupling is reached through in iterative relaxation technique, either direct or semi-inverse according to the local shape parameters of the boundary layer or of the dissymmetrical wake. The wake geometry is calculated. The viscous mean flow is thoroughly determined and visualized. Examples of application to subsonic or supercritical airfoils, and to separated trailing-edges, are given. Author (ESA)

N82-19156# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ELECTRICAL GROUND TESTING OF AIRCRAFT ANTISTATIC PROTECTION c03

A. Bruere *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 47-56 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 187-196 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Methods of ensuring aircraft protection against electrostatic spurious phenomena are reviewed and a device for ground testing of this protection is described. The equipment provides for checking the surface resistance of antistatic treatments as well as the quality of the electrical connections between the various components of the external structure and the aircraft potential reference point. Problems in electrostatic quality control for aircraft when testing in the presence of a finishing coat of paint are emphasized. The prototype device is depicted while operating and performance principles are explained. Author (ESA)

N82-19157# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

A SUBSPACE ITERATION ALGORITHM FOR SPINNING STRUCTURE VIBRATION MODE COMPUTATION c39

D. Osmont and L. Simon *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 57-62 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 197-202 (For primary document see N82-19152 10-01)

Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A subspace inverse iteration algorithm is presented. Calculations for approximations of vibration modes for a discretized rotating structure, using finite elements, are explained. The equation is constructed with eigenvalues and eigenvectors from which it is easy to deduce the vibration modes. algorithm is discussed. The matrices of mass gyroscopic coupling and rigidity for mechanical systems discretized using finite elements are of large dimension and have a band structure. The algorithm, which simultaneously calculates several eigenvectors, is well adapted to large systems. It can also be adapted to damped structures for which a symmetrical, structural, damped matrix is superposed on the gyroscopic coupling matrix. Author (ESA)

N82-19158# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
INDUCTION DRIVEN TRANSONIC WIND TUNNEL T2: OPERATION AT ROOM TEMPERATURE AND CRYOGENIC ADAPTATION c09
A. Mignosi, D. Faulmann, and A. Seraudie *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 63-74 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 203-215 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

The transformation of the induction driven wind tunnel T2 (0.4 m X 0.4 m) into a cryogenic intermittent wind tunnel which uses high pressure air as driving gas and nitrogen as coolant is described. The operating mode and optimization of the wind tunnel for low temperature operation are discussed. Theoretical and experimental aspects of the transformed facilities, i.e., modification of the circuit, thermal insulation techniques, liquid nitrogen injection, startup process, cryogenic operating mode, and expected performance, are presented. Author (ESA)

N82-19159# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TESTING VENTILATED NOZZLE MODELS WITH SUPERSONIC PRIMARY FLOW c02
J. Paulon and J. Perucchini *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 75-79 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 217-221 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Ventilated nozzles, i.e., aircraft engine ejectors with, at the periphery of the engine flux, a low rate flow from a circuit different from that passing through the compressor, the combustion chamber and the turbine, are considered. Theoretical schemes that take precise and correct account of the evolution of the two fluxes in order to deduce nozzle efficiency and jet engine thrust are examined. Simplifying hypotheses are discussed and tests carried out in an aerothermodynamic laboratory to confirm them are described. Results define the domain of influence of downstream disturbances which can modify nozzle performance. Author (ESA)

N82-19160# Network Analysis Corp., Vienna, Va.
NATIONAL AIRSPACE DATA INTERCHANGE NETWORK (NADIN) SUPPORT OF REMOTE MAINTENANCE MONITORING SYSTEM (RMMS) Final Report
Dec. 1981 111 p refs
(Contract DOT-FA79WA-4335)
(AD-A109125; NAC/FR-303J/01; FAA-RD-81-109) Avail: NTIS HC A06/MF A01 CSCL 05/2

National Airspace Data Interchange Network (NADIN) architectural enhancements necessary to support the Remote Maintenance Monitoring System (RMMS) and MMS programs are described. Several alternative approaches are formulated. These alternatives are compared and recommendations are made. It is found that: The NADIN backbone has sufficient capacity to handle initial RMMS traffic at adequate performance levels; An X.25 compatible interface for the NADIN and MPS connection is recommended; Additional frame routing capabilities at the NADIN concentrator and front end processors are required; and Future MPS communications will be best served by a fully distributed packet switched NADIN capable of supporting complete X.25 functions. Author (GRA)

N82-19161# Aeronautical Research Labs., Melbourne (Australia).
AERONAUTICAL RESEARCH LABORATORIES STRUCTURES DIVISION Annual Report, 1979 - 1980
F. H. Hooke, ed. Apr. 1981 46 p
(AD-A109049; ARL/STRUC-NOTE-473) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report describes the functions, organization, staffing, unclassified research activities and ad-hoc investigations in progress in the Structures Division, Aeronautical Research Laboratories during the year 1979/80. Author (GRA)

N82-19162# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
THE EUROPEAN AIRBUS: A CHALLENGE TO THE AMERICAN COMMERCIAL AIRCRAFT INDUSTRY [DER EUROPAEISCHE AIRBUS EINE HERAUSFORDERUNG AN DIE AMERIKANISCHE VERKEHRSFLUG ZEUGINDUSTRIE]
Heribert Flosdorff 1981 56 p Partly in GERMAN and ENGLISH Presented at 7th A.W. Quick-B.H. Geothhert vorfesung, Aachen, 18 Feb. 1981
(MBB-UH-01-81-O) Avail: NTIS HC A04/MF A01

The challenge and competition of the European Airbus to the American aircraft industry is discussed. The history of the colaboration between western European countries in the development, planning, construction, and management of short and intermediate haul commercial jet airplanes is described. It is contended that sales to third world, oriental, and south east Asian countries, and the expansion to wide bodied airplanes established the airbus industry as an firm competitior on the world market. The wide bodied two engine aircraft shows considerable technical superiority and obvious aerodynamics improvements as compared to technologically equal wide bodied jets. The following comparisons with American similar aircrafts are made: performance reliability; flight operations data; aerodynamic standards; fuel consumption; noise absorption; weight/actual load operating span; production efficiency and strategy; A 310 advanced technology; cockpits; warning systems; and marketing potentials. Transl. by E.A.K.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N82-19163 California Univ., Berkeley.
NUMERICAL STUDY OF INCOMPRESSIBLE SLIGHTLY VISCOUS FLOW PAST BLUNT BODIES AND AIRFOILS Ph.D. Thesis
Angela Yit Lean Cheer 1981 94 p
Avail: Univ. Microfilms Order No. 8200050

A grid free numerical method is used to simulate incompressible flow at high Reynolds number. The numerical method simulates the flow inside the boundary layer by vortex sheets and the flow outside this layer by vortex blobs. The algorithm produces a smooth transition between the sheets and the blobs. The accuracy of this hybrid numerical method is tested in several numerical experiments. In the first experiment, the algorithm is used to simulate slightly viscous flow past a circular cylinder. In the second experiment, the algorithm is used to simulate flow past a Joukowski airfoil at various angles of attack. In the latter case, there is no evidence of 'blow-up' of the flow at the trailing edge of the airfoil. In both experiments, the calculated flow and its functionals (such as lift and drag coefficients) are in good agreement with both theoretical results and wind tunnel experiments. Dissert. Abstr.

N82-19164*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SPANWISE LOADING DISTRIBUTION AND WAKE VELOCITY SURVEYS OF A SEMI-SPAN WING
Fort F. Felker, III, Raymond A. Piziali (Army Aviation Research and Development Command, Moffett Field, Calif.), and Jay K. Gall (Informatics Inc., Moffett Field, Calif.) Feb. 1982 197 p refs Prepared in cooperation with Army Aviation Research and Development Command
(NASA-TM-84213; A-8819; USAAVRADCOM-TR-81-A-1) Avail: NTIS HC A09/MF A01 CSCL 01A

The spanwise distribution of bound circulation on a semi-span wing and the flow velocities in its wake were measured in a wind tunnel. Particular attention was given to documenting the flow velocities in and around the development tip vortex. A two-component laser velocimeter was used to make the velocity measurements. The spanwise distribution of bound circulation,

three components of the time-averaged velocities throughout the near wake their standard deviations, and the integrated forces and moments on a metric tip as measured by an internal strain gage balance are presented without discussion. Author

N82-19165*# Old Dominion Univ., Norfolk, Va.
EXPERIMENTAL STUDY OF DELTA WING LEADING-EDGE DEVICES FOR DRAG REDUCTION AT HIGH LIFT
Thomas D. Johnson, Jr. and Dhanvada M. Rao Feb. 1982 139 p refs
(Contract NGR-47-003-052)
(NASA-CR-165846) Avail: NTIS HC A07/MF A01 CSCL 01A

The drag reduction devices selected for evaluation were the fence, slot, pylon-type vortex generator, and sharp leading-edge extension. These devices were tested on a 60 degree flatplate delta (with blunt leading edges) in the Langley Research Center 7- by 10-foot high-speed tunnel at low speed and to angles of attack of 28 degrees. Balance and static pressure measurements were taken. The results indicate that all the devices had significant drag reduction capability and improved longitudinal stability while a slight loss of lift and increased cruise drag occurred. R.J.F.

N82-19166*# Kansas Univ. Center for Research, Inc., Lawrence.
A VORTEX-FILAMENT AND CORE MODEL FOR WINGS WITH EDGE VORTEX SEPARATION
Jenn-Louh Pao and C. Edward Lan Feb. 1982 130 p refs
(Contract NCC1-18)
(NASA-CR-165847) Avail: NTIS HC A07/MF A01 CSCL 01A

A vortex filament-vortex core method for predicting aerodynamic characteristics of slender wings with edge vortex separation was developed. Semi-empirical but simple methods were used to determine the initial positions of the free sheet and vortex core. Comparison with available data indicates that: (1) the present method is generally accurate in predicting the lift and induced drag coefficients but the predicted pitching moment is too positive; (2) the spanwise lifting pressure distributions estimated by the one vortex core solution of the present method are significantly better than the results of Mehrotra's method relative to the pressure peak values for the flat delta; (3) the two vortex core system applied to the double delta and strake wings produce overall aerodynamic characteristics which have good agreement with data except for the pitching moment; and (4) the computer time for the present method is about two thirds of that of Mehrotra's method. Author

N82-19167*# Boeing Military Airplane Development, Seattle, Wash.
TRANSONIC PERTURBATION ANALYSIS OF WING-FUSELAGE-NACELLE-PYLON CONFIGURATIONS WITH POWERED JET EXHAUSTS
J. C. Wai, C. C. Sun, and H. Yoshihara Feb. 1982 67 p refs
(Contract NAS1-15887)
(NASA-CR-165852) Avail: NTIS HC A04/MF A01 CSCL 01A

A method using a transonic small disturbance code with successive line over-relaxation is described for treating wing/fuselage configurations with a nacelle/pylon/powered jet. Examples illustrating its use for the NASA transport research model are given. Reasonable test/theory comparisons were obtained. Author

N82-19168*# Texas A&M Univ., College Station. Dept. of Aerospace Engineering.
INVERSE TRANSONIC AIRFOIL DESIGN METHODS INCLUDING BOUNDARY LAYER AND VISCOUS INTERACTION EFFECTS Semiannual Progress Report, 1 Aug. 1981 - 31 Jan. 1982
Leland A. Carlson Feb. 1982 22 p refs
(Grant NsG-1174)
(NASA-CR-168579; TAMRF-3224-82-01) Avail: NTIS HC A02/MF A01 CSCL 01A

A body-fitted grid embedment technique applicable to inviscid transonic airfoil flow field analysis was developed and verified through a series of tests. Test cases used to verify the technique show that the accuracy of the solution was increased by grid embedding. This enhancement of the solution is especially true when small supercritical zones occur which cannot be adequately described using the main grid only. Results obtained with the SKANFP full potential program are considered with regard to the massive separated flow and high lift and the undesirable unrealistic 'bump' in the vicinity of the separation point due to a mismatch between the unseparated and separated pressure distributions. Techniques used to eliminate this feature are discussed. A.R.H.

N82-19169*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
APPLICATION OF AN AIRFOIL STALL FLUTTER COMPUTER PREDICTION PROGRAM TO A THREE-DIMENSIONAL WING: PREDICTION VERSUS EXPERIMENT M.S. Thesis
Anthony J. Muffoletto Mar. 1982 136 p refs
(Grant NsG-3304)
(NASA-CR-168586) Avail: NTIS HC A07/MF A01 CSCL 01A

An aerodynamic computer code, capable of predicting unsteady and C sub m values for an airfoil undergoing dynamic stall, is used to predict the amplitudes and frequencies of a wing undergoing torsional stall flutter. The code, developed at United Technologies Research Corporation (UTRC), is an empirical prediction method designed to yield unsteady values of normal force and moment, given the airfoil's static coefficient characteristics and the unsteady aerodynamic values, alpha, A and B. In this experiment, conducted in the PSU 4' x 5' subsonic wind tunnel, the wing's elastic axis, torsional spring constant and initial angle of attack are varied, and the oscillation amplitudes and frequencies of the wing, while undergoing torsional stall flutter, are recorded. These experimental values show only fair comparisons with the predicted responses. Predictions tend to be good at low velocities and rather poor at higher velocities. Author

N82-19170*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 1: EXECUTIVE SUMMARY
5 Dec. 1980 115 p refs Workshop held at Palo Alto, Calif., 3-5 Dec. 1980
(NASA-TM-84149) Avail: NTIS HC A06/MF A01 CSCL 01A

This presentation provides an overview of the NASA Rotorcraft Program as an introduction to the technical sessions of the Advanced Rotorcraft Technology Workshop. It deals with the basis for NASA's increasing emphasis on rotorcraft technology, NASA's research capabilities, recent program planning efforts, highlights of its 10-year plan and future directions and opportunities. L.F.M.

N82-19171*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 2: OPERATORS' VIEWS
5 Dec. 1980 111 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84148) Avail: NTIS HC A06/MF A01 CSCL 01A

A special panel of helicopter users give presentations in 12 basic areas of helicopter applications. Development of the helicopter and the needs for future growth are discussed. L.F.M.

N82-19172*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 3: AERODYNAMICS AND STRUCTURES SESSION
4 Dec. 1980 285 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84147) Avail: NTIS HC A13/MF A01 CSCL 01A

Advanced rotorcraft technology and tilt rotor aircraft were discussed. Rotorcraft performance, acoustics, and vibrations were discussed, as was the use of composite materials in rotorcraft structures. Rotorcraft aerodynamics, specifically the aerodynamic

phenomena of a rotating and the aerodynamics of fuselages, was discussed. R.J.F.

N82-19173*# National Aeronautics and Space Administration, Washington, D. C.
NASA/HAA ADVANCED ROTORCRAFT TECHNOLOGY AND TILT ROTOR WORKSHOPS. VOLUME 4: FLIGHT CONTROL AVIONICS SYSTEMS AND HUMAN FACTORS
5 Dec. 1980 149 p refs Workshop held at Palo Alto, Calif., 2-5 Dec. 1980
(NASA-TM-84146) Avail: NTIS HC A07/MF A01 CSCL 01A

Helicopter user needs, technology requirements and status, and proposed research and development action are summarized. It is divided into three sections: flight dynamics and control; all weather operations; and human factors. L.F.M.

N82-19174*# Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
SOME OBSERVATIONS OF SURFACE PRESSURES AND THE NEAR WAKE OF A BLUNT TRAILING EDGE AIRFOIL
R. V. Digumarthi, S. P. Koutsoyannis, and K. Karamcheti Jun. 1981 189 p refs
(Grants NsG-2007; NsG-2233)
(NASA-CR-168563; SU-JIAA-TR-39) Avail: NTIS HC A09/MF A01 CSCL 01A

Experiments with a truncated and untruncated airfoils of profiles NACA 640A10, were carried out in subsonic wind tunnels in a velocity range of 19m/s to 54m/s corresponding to Reynolds numbers of 200,000 to 468,000 based on the chord. Airfoil spanned the test section to achieve two dimensionality of the model. Velocity measurements, pressure measurements, and vortex shedding in the wake were measured using a hotwire and pressure transducers. The measured chordwise static pressure distribution on the smooth trailing edge airfoil along the midspan plane, agreed with the theoretical results calculated on the basis of the potential flow for that airfoil. Boundary layer profiles measured in the midspan plane, behind the maximum thickness of the airfoil show no separation of the flow. Spanwise distribution of the measured static pressure on the upper surface of the airfoil shows uniformity for both configurations with and without the boundary layer trip. This uniformity of pressure distribution and separation indicates that the flow on the airfoil was uniform and two dimensional in character. T.M.

N82-19175*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RAXJET: A COMPUTER PROGRAM FOR PREDICTING TRANSONIC, AXISYMMETRIC FLOW OVER NOZZLE AFTERBODIES WITH SUPERSONIC JET EXHAUSTS
Richard G. Wilmoth Feb. 1982 76 p refs
(NASA-TM-83235; L-14789) Avail: NTIS HC A05/MF A01 CSCL 01A

A viscous-inviscid interaction method to calculate the subsonic and transonic flow over nozzle afterbodies with supersonic jet exhausts was developed. The method iteratively combines a relaxation solution of the full potential equation for the inviscid external flow, a shock capturing-shock fitting inviscid jet solution, an integral boundary layer solution, a control volume method for treating separated flows, and an overlaid mixing layer solution. A computer program called RAXJET which incorporates the method, illustrates the predictive capabilities of the method by comparison with experimental data is described, a user's guide to the computer program is provided. The method accurately predicts afterbody pressures, drag, and flow field properties for attached and separated flows for which no shock induced separation occurs. E.A.K.

N82-19176# Weapons Systems Research Lab., Salisbury (Australia). Defence Research Centre.
COMPUTATIONAL AERODYNAMICS AT WEAPONS SYSTEMS RESEARCH LABORATORY
L. M. Sheppard Oct. 1981 14 p refs
(WSRL-0236-TM; AR-002-640) Avail: NTIS HC A02/MF A01

Computer related aerodynamic research is reviewed. Three digital computers were used, namely, WREDAC, IBM 7090, and IBM 370. Potential applications include unguided bombs, bomblets, bullets, mortars, rockets and shells, as well as terminally corrected release of external stores from aircraft and carriage of external stores on aircraft. S.L.

N82-19177*# Boeing Commercial Airplane Co., Seattle, Wash.
TRANSONIC PRESSURE MEASUREMENTS AND COMPARISON OF THEORY TO EXPERIMENT FOR THREE ARROW-WING CONFIGURATIONS Final Summary Report
Marjorie E. Manro Washington NASA Feb. 1982 550 p refs
(Contract NAS1-14962)
(NASA-CR-3434; D6-51079-1) Avail: NTIS HC A23/MF A01 CSCL 01A

Wind tunnel tests of arrow-wing body configurations consisting of flat, twisted, and cambered twisted wings, as well as a variety of leading and trailing edge control surface deflections, were conducted at Mach numbers from 0.4 to 1.05 to provide an experimental pressure data base for comparison with theoretical methods. Theory to experiment comparisons of detailed pressure distributions were made using state of the art attached flow methods. Conditions under which these theories are valid for these wings are presented. S.L.

N82-19178*# Hamilton Standard, Windsor Locks, Conn.
EVALUATION OF WIND TUNNEL PERFORMANCE TESTINGS OF AN ADVANCED 45 DEG SWEPT 8-BLADED PROPELLER AT MACH NUMBERS FROM 0.45 TO 0.85 Final Report
C. Rohrbach, F. B. Metzger, D. M. Black, and R. M. Ladden Washington NASA Mar. 1982 129 p refs
(Contract NAS3-20769)
(NASA-CR-3505) Avail: NTIS HC A07/MF A01 CSCL 01A

The increased emphasis of fuel conservation in the world and the rapid increase in the cost of jet fuel has stimulated a series of studies of both conventional and unconventional propulsion systems for commercial aircraft. The results of these studies indicate that a fuel saving of 15 to 30 percent may be realized by the use of an advanced high-speed turboprop (Prop-Fan) compared to aircraft equipped with high bypass turbofan engines of equivalent technology. The Prop-Fan propulsion system is being investigated as part of the NASA Aircraft Energy Efficient Program. This effort includes the wind tunnel testing of a series of 8 and 10-blade Prop-Fan models incorporate swept blades. Test results indicate efficiency levels near the goal of 80 percent at Mach 0.8 cruise and an altitude of 10.67 km (35,000 ft). Each successive swept model has shown improved efficiency relative to the straight blade model. The fourth model, with 45 deg swept blades reported herein, shows a net efficiency of 78.2 at the design point with a power loading of 301 kW/sq meter and a tip speed of 243.8 m/sec (800 ft/sec.). Author

N82-19179*# Boeing Commercial Airplane Co., Seattle, Wash.
COMPUTATION OF TRANSONIC POTENTIAL FLOW ABOUT 3 DIMENSIONAL INLETS, DUCTS, AND BODIES
Theodore A. Reyhner Washington NASA Mar. 1982 94 p refs
(NASA-CR-3514; D6-49848) Avail: NTIS HC A05/MF A01 CSCL 01A

An analysis was developed and a computer code, P465 Version A, written for the prediction of transonic potential flow about three dimensional objects including inlet, duct, and body geometries. Finite differences and line relaxation are used to solve the complete potential flow equation. The coordinate system used for the calculations is independent of body geometry. Cylindrical coordinates are used for the computer code. The analysis is programmed in extended FORTRAN 4 for the CYBER 203 vector computer. The programming of the analysis is oriented toward taking advantage of the vector processing capabilities of this computer. Comparisons of computed results with experimental measurements are presented to verify the analysis. Descriptions of program input and output formats are also presented. B.W.

N82-19180*# McDonnell-Douglas Corp., St. Louis, Mo.
SUBSONIC PANEL METHOD FOR THE EFFICIENT ANALYSIS OF MULTIPLE GEOMETRY PERTURBATIONS
D. R. Bristow and J. D. Hawk Washington NASA Mar. 1982 101 p refs

(Contract NAS1-16156)
(NASA-CR-3528) Avail: NTIS HC A06/MF A01 CSCL 01A

An accurate and efficient method was developed for the aerodynamic analysis of a series of arbitrary small geometry perturbations to a given baseline configuration. The method is appropriate for wing-fuselage configurations in incompressible potential flow. Mathematical formulations are presented for three computer programs that are employed. The first program is a conventional surface panel method for calculating the baseline singularity distribution. The second program calculates a partial derivative matrix. Each element of the matrix is the rate of change of singularity strength at one point with respect to a surface coordinate of a different point. For each baseline configuration, the calculated quantities from the first two programs establish an input file for the third. The third program calculates the surface pressure distribution and forces and moments for a series of geometry perturbations. B.W.

N82-19181*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

EFFECTS OF INSTALLATION OF F101 DFE EXHAUST NOZZLES ON THE AFTERBODY-NOZZLE CHARACTERISTICS OF THE F-14 AIRPLANE

David E. Reubush and John R. Carlson Mar. 1982 133 p refs
(NASA-TM-83250; L-14895) Avail: NTIS HC A07/MF A01 CSCL 01A

A wind-tunnel investigation was conducted to determine the effects of F101 DFE (derivative fighter engine) nozzle axial positioning on the afterbody-nozzle longitudinal aerodynamic characteristics of the F-14 airplane. The model was tested in the Langley 16-Foot Transonic Tunnel at Mach numbers from 0.7 to 1.25 and angles of attack from about -2 to 6 degrees. Compressed air was used to simulate nozzle exhaust flow at jet total-pressure ratios from 1 (jet off) to about 8. The results of the investigation show that for subsonic Mach numbers the intermediate cruise nozzle position of the three positions tested resulted in the lowest drag. Author

N82-19182# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

THEORETICAL INVESTIGATION OF THE FLOW OF A SUPERSONIC FREE JET FROM A SLIT Thesis [THEORETISCHE UNTERSUCHUNG DER STROEMUNG EINES UEBERSCHALLFREISTRAHLS AUS EINER SCHLITZFOERMIGEN OEFFNUNG]

Horst Wegner Dec. 1980 79 p refs In GERMAN
(MPIS-25/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,85

The flow a subsonic jet from a slot shaped port was investigated. The following problems were examined: equations by mathematical models; subsonic free jets from a port opening; formulation of a boundary value problem for a subsonic free jet with maximum mass flow; and solving of boundary values for supersonic free jets with maximum mass flow. Transl. by E.A.K.

N82-19183# Aeronautical Research Labs., Melbourne (Australia).

HIGH SPEED AERODYNAMIC CHARACTERISTICS OF THE GAFOPH AEROFOIL

B. D. Fairlie Sep. 1980 49 p refs
(AD-A108922; ARL/AERO-NOTE-398; AR-002-223) Avail: NTIS HC A03/MF A01 CSCL 20/4

Transonic wind tunnel tests are reported on a two dimensional model of the GAFOPH aerofoil. The tests covered Mach numbers in the range 0.5 to 0.85 and angles of incidence from -3 deg to above maximum life coefficient. Tests were conducted both with natural transition and with transition artificially fixed. Maximum lift coefficient was found to lie just below 0.8 for most of the Mach number range and was followed by a fairly gentle stall. Drag rise Mach number was found to lie between 0.75 and 0.76 for lift coefficients up to 0.4. A leading edge separation bubble was found on the upper surface of the aerofoil for angles of incidence greater than 2-1/2 deg.
Author (GRA)

N82-19184# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.

ADDITIONAL RESULTS OF A STUDY OF UNSTEADY AIRFOIL SURFACE PRESSURES AND TURBULENT BOUNDARY LAYERS Annual Report, 1 Sep. 1980 - 31 Aug. 1981

Eugene E. Covert and Peter F. Lorber Nov. 1981 39 p refs
(Grant AF-AFOSR-0282-80; AF Proj. 2307)
(AD-A108978; TR-212; AFOSR-81-0848TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

Unsteady pressure coefficients measured on an N.A.C.A. 0012 airfoil at geometric angles of attack of 0 and 10 degrees, Reynolds numbers of 700,000 and 1,000,000 and in the reduced frequency range of 0.5 to 6.4 (based upon the half chord) are presented. For simplicity the data are represented in terms of mean and unsteady pressure coefficients, which has both a magnitude and a phase. Primary conclusions are: (1) The difference pressures approach zero at the trailing edge. This corresponds to satisfying one statement of the Kutta condition. (2) Superposition of the unsteady processes in the steady flow seems accurate and valid up to reduced frequencies of 2. (3) For this airfoil with 16 deg trailing edge angle the effects of viscosity seem to be most prominent in the last 10 percent of the airfoil where the phase lags are much larger than those predicted by the linear theory. Author (GRA)

N82-19185# Montana State Univ., Bozeman. Supersonic Wind Tunnel Lab.

THE COMPRESSIBLE LAMINAR TWO-DIMENSIONAL WAKE WITH ARBRITRARY INITIAL ASYMMETRY Annual Report, 1 Oct. 1980 - 30 Sep. 1981

Anthony Demetriades Jul. 1981 86 p refs
(Grant AF-AFOSR-0267-80; AF Proj. 2307)
(AD-A109084; SWT-81-3; AFOSR-81-0841TR) Avail: NTIS HC A05/MF A01 CSCL 20/4

Closed-form analytic solutions are presented for the two dimensional laminar wake, which are applicable from the trailing edge to infinite downstream distances, and for any 'initial asymmetry' ratio of the two merging boundary layer thicknesses. An initially exponential velocity profile is assumed, and Gold's treatment is utilized of the evolution of the profile based on the Oseen approximation. The solutions show the effect of edge Mach number, Reynolds number, wall-to-stagnation temperature ratio and asymmetry factor. Beyond a certain distance from the trailing edge the solutions reduce to the well-known asymptotic behavior regardless of the magnitude of these parameters. In the 'non-equilibrium' region from the trailing edge to the equilibration distance, the supersonic/hypersonic cooled wake behaves rather abnormally. The effect of initial asymmetry is to deflect the wake center off the plane of the trailing edge, and to displace the wake center of the velocity relative to the temperature-density center without much affecting the velocity, temperature or density defect magnitudes or the wake thickness. Comparison with earlier work shows very good agreement with the Tollmien-Goldstein implicit solutions near the trailing edge for symmetric incompressible flows. Good agreement is also found with available experimental data. Author (GRA)

N82-19186# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CHARACTERISTIC AERODYNAMIC COEFFICIENTS AT HIGH REYNOLDS NUMBERS

Jan Staszek 3 Dec. 1981 17 p refs Transl. into ENGLISH from Tech. Lotnicza Astronautyczna (Poland), no. 1, 1979 p 25-28
(AD-A109313; FTD-ID(RS)T-1263-81) Avail: NTIS HC A02/MF A01 CSCL 20/4

Changes in the characteristics of aerodynamic coefficients at high Reynolds numbers were investigated. Emphasis is placed on the transonic range. Results from wind tunnel and flight test are presented. Changes are compared with results from theoretical and experimental tests. E.A.K.

N82-19187# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CALCULATION OF SUPERSONIC THREE-DIMENSIONAL FLOW ABOUT BLUNT-NOSED BODIES

Youlan Zhu, Ruquan Wand, and Xichang Zhong 19 Nov. 1981 26 p refs Transl. into ENGLISH from Peking Li-hsueh (Mech.) (China), no. 4, 1977 p 270-282

(AD-A108808; FTD-ID(RS)T-0927-81) Avail: NTIS HC A03/MF A01 CSCL 20/4

Inviscid and non-heating-conducting steady-state gaseous flows are considered. The straight-line method was used to calculate flow in the supersonic region and flow with a sharp angle of attack. The calculated objects' shapes were ellipsoids with various axial ratios as well as objects which were nearly disc-shaped. T.M.

N82-19188# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

SINGULARITIES OF THE SOLUTION OF THE PROBLEM OF A WEAKLY PERTURBED SUPERSONIC FREE JET WITH ROTATIONAL SYMMETRY [DIE SINGULARITAETEN DER LOESUNG DES SCHWACH GESTOERTEN ROTATIONSSYMMETRISCHEN UEBERSCHALLFREISTRAHLES]

Georg Grabitz and Hans-Wilhelm Burmann (Goettingen Univ., West Germany) Oct. 1980 28 p refs In GERMAN (MPIS-6/1980) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,20

Singularity in jet boundaries was mathematically interpreted. The solution of linearized basic equations for rotation symmetrical supersonic free jets is proposed. Sequences which occur in solution equations of geometric forms, like the flow dimension inside the free jet are treated. Transl. by E.A.K.

N82-19189# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

CHARACTERISTICS OF VON KARMAN-TREFFTZ PROFILES [ENIGE KARAKTERISTIEKE GROOTHEDEN VAN VON KARMAN-TREFFTZ PROFIELEN]

J. J. H. Blom Jun. 1981 40 p refs In DUTCH (VTH-LR-323) Avail: NTIS HC A03/MF A01

For von Karman-Trefftz profiles, the characteristics which determine profile shape (profile nose dimensions, maximum thickness and position; tail slope and curvature) are stated as a function of transformation variables using the Timman method. The profile is obtained by iterative deformation of a von Karman profile with known transformation, corresponding as well as possible to the desired profile. The figures and relations which enable a good choice of the required profile are given. Author (ESA)

N82-19190# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

A METHOD OF CHARACTERISTIC SURFACES: THE APPROXIMATE SOLUTION OF THREE-DIMENSIONAL SUPERSONIC FLOW FIELDS, FROM THE NEAR FIELD UP TO THE SONIC BOOM REGION

T. P. M. Hendriks Aug. 1981 171 p refs (VTH-LR-331) Avail: NTIS HC A08/MF A01

A method of characteristic surfaces used to describe supersonic flow past a three dimensional lifting or nonlifting body, uniformly valid up to first order, is developed. Uniformity is achieved by a straining of the spatial coordinates of the nonuniform solution derived from classical linearized theory. Development is based on a geometric study of the characteristic surfaces which envelop spatial disturbances in otherwise planar supersonic flow. Linearized theory gives a correct first order description of a complete three dimensional flow field provided that the intersection curves of the acoustical characteristic surfaces with the acoustical main characteristic planes are replaced by those of the corresponding first order surfaces and planes. A simplified procedure for supersonic flow fields, which are dominated by only one three dimensional disturbance field, is demonstrated using conical flow at the leeward side, and wave formation at the windward side of a supersonic delta wing. Author (ESA)

N82-19191# Bristol Univ. (England). Dept. of Aeronautical Engineering.

AN INVESTIGATION INTO WING-CANARD INTERACTION FOR A MODEL WITH FORWARD SWEPT WINGS B.S. Thesis

S. B. Marshall and M. J. Knott Jun. 1981 88 p refs (BU-261) Avail: NTIS HC A05/MF A01

A few of the fundamental wing/canard interference effects were investigated in a wind tunnel, and theoretically. In particular, the relative horizontal, vertical and pitch deflection of the two lifting surfaces on a fuselage were studied for their influence on interference and, as a consequence, on the principal lift, drag and moment coefficients. Results show not only how these coefficients are changed, but also, by the use of the theoretical model, the distribution of forces which are peculiar to this configuration. One variation on the standard shape was to add wing root fillets at the leading edge so as to influence stall characteristics; the virtues of such a scheme are quantified where possible. Author (ESA)

N82-19192# Bristol Univ. (England). Dept. of Aeronautical Engineering.

THE UNSTEADY AERODYNAMICS OF CERTAIN BLUFF SHAPES B.S. Thesis

K. P. Kalligas and N. Moyssidis Jun. 1981 71 p refs (BU-264) Avail: NTIS HC A04/MF A01

A technique for obtaining reliable dynamic aerodynamic characteristics was devised. A 'decaying oscillations' rig was designed and built, then used to test a 1:3 scale Martin-Baker ejection seat and a 5:2:2 model container box. Limitations imposed either by wind tunnel turbulence or by nonlinear aerodynamics, meant restricting the range of the amplitude of oscillation to between 2 deg and 10 deg, each way. Results for the box and static stability characteristics of the ejection seat agree with previous work, giving an indication of the reliability of the technique. Regions of dynamic instability are almost invariably associated with attached flow on one surface and separated flow on another (usually opposite) surface, changing to separated flow on the first surface and attached flow on the second (via bubble flow) as the body changes attitude during oscillation. A theoretical approach to the nonlinear aerodynamics of such a system is outlined. Use of the technique in estimating add-mass, evaluating the net area under the curve: aerodynamic stiffness coefficient versus angle of incidence, is suggested. Author (ESA)

N82-19193# Bristol Univ. (England). Dept. of Aeronautical Engineering.

A STUDY OF THE EFFECTS OF LEADING-EDGE SLATS ON THE PERFORMANCE OF SLENDER WINGS B.S. Thesis

K. P. Graham and E. J. Motlhathudi Jun. 1981 85 p refs (BU-266) Avail: NTIS HC A05/MF A01

The improvements in lift/drag (L/D) ratio predicted by conical delta with slats theory were confirmed. The L/D benefits on a slender delta of aspect ratio 1 with parallel leading edge slats were considered. The local normal force distributions for various values of incidence, slot width, and slat angle are measured on a conical delta with spanwise pressure tappings. Insight into the surface flow was gained by the oil flow pattern technique. It is concluded that considerable L/D improvements are found for certain geometric configurations when using parallel slats. Author (ESA)

N82-19194# Bristol Univ. (England). Dept. of Aeronautical Engineering.

THE EFFECT OF A WELL ON THE AERODYNAMICS OF A SPOILER B.S. Thesis

N. A. Cemm and J. J. Ovens Jun. 1981 82 p refs Original contains color illustrations (BU-268) Avail: NTIS HC A05/MF A01

As an aid to spoiler design, the aerodynamics of a spoiler and its well were investigated. Particular attention was paid to gap and deployment angle. Three different shapes of spoiler and three types of well were tested. All tests were two dimensional, the spoiler being attached to a flat plate at zero incidence. A well was cut into the plate such that the spoiler was flush when not deployed. The Reynolds number was 62,000, based on fence chord. Flow visualization techniques and static pressure measurements were used both along the flat plate and around the spoiler to determine and understand the pressure distribution. Integration of the pressure results shows the normal force distribution. The application of the results to spoiler design is discussed through examples. Author (ESA)

N82-19153# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

ROLLING UP OF VORTEX SHEETS FROM THE EDGES OF

LIFTING SURFACES
R. Legendre *In its* La Rech. Aerospatiale Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 3-7 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, May-Jun. 1981" p 143-147 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-19155# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
STRONG MATCHING METHOD FOR COMPUTING TRANSONIC VISCOUS FLOWS INCLUDING WAKES AND SEPARATIONS: LIFTING AIRFOILS
J. C. LeBalleur *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 21-45 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 161-185 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-19159# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TESTING VENTILATED NOZZLE MODELS WITH SUPERSONIC PRIMARY FLOW
J. Paulon and J. Perucchini *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 75-79 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 217-221 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-20132# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
THEORETICAL AND EXPERIMENTAL DETERMINATION OF A COMPRESSOR TRANSFER FUNCTION
J. Fabri and J. Paulon *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 1-8 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-231 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-19195 Department of Trade and Industry, London (England).
REPORT OF THE AIR TRAFFIC FORECASTING WORKING PARTY, 1981
Sep. 1981 30 p ref
Copyright. Avail: Issuing Activity

The U.K. forecasting model (improved by including relative tourist prices as a variable in leisure traffic equations and by refining business traffic specifications) is used to predict air traffic demand in the 1990's. London airports are treated separately. The effects of oil price rises, a channel tunnel, and hotel constraints in London are discussed. An increase of between 28 and 70 million passagers is predicted, i.e., a 2.5% to 5% annual growth rate. Growth rates for domestic traffic are lower than those projected for international traffic so that domestic traffic, which was 26% of the total in 1979, falls by 1995 to 23% on the low scenario and 20% on the high scenario. Author (ESA)

N82-19196*# Little (Arthur D.), Inc., Cambridge, Mass.
AN ASSESSMENT OF THE CRASH FIRE HAZARD OF LIQUID HYDROGEN FUELED AIRCRAFT Final Report
Feb. 1982 132 p refs
(Contract NAS3-22482)
(NASA-CR-165526; ADL-85161) Avail: NTIS HC A07/MF A01 CSCL 01C

The crash fire hazards of liquid hydrogen fueled aircraft relative to those of mission equivalent aircraft fueled either with conventional fuel or with liquefied methane were evaluated. The aircraft evaluated were based on Lockheed Corporation design for 400 passenger, Mach 0.85, 5500 n. mile aircraft. Four crash scenarios were considered ranging from a minor incident causing some loss of fuel system integrity to a catastrophic crash. Major tasks included a review of hazardous properties of the alternate fuels and of historic crash fire data; a comparative hazard evluation for each of the three fuels under four crash scenarios a comprehensive review and analysis and an identification of areas further development work. The conclusion was that the crash fire hazards are not significantly different when compared in general for the three fuels, although some fuels showed minor advantages in one respect or another. R.J.F.

N82-19197# Federal Aviation Administration, Atlantic City, N.J.
ANALYSIS OF A NONLINEAR ALTITUDE TRACKING METHOD Final Report, Sep. - Dec. 1980
Barry R. Billmann Nov. 1981 57 p refs
(FAA Proj. 052-242-320)
(AD-A108878; FAA-CT-81-15; FAA-RD-81-60) Avail: NTIS HC A04/MF A01 CSCL 01/2

This report analyzes the performance of the nonlinear altitude tracker developed for the Active Beacon Collision Avoidance System (BCAS) by Lincoln Laboratory. The tracker is intended for use in the collision avoidance logic of the BCAS system. The nonlinear tracker performance was characterized through comparisons with the previous altitude tracker. The original tracker, used by the collision avoidance logic, was a simplistic alpha-beta tracker. The nonlinear tracker performance evaluation was conducted in three phases: (1) The stand-alone error characteristics of the tracker were obtained. Simulated mode C report sequences were provided directly to the tracker. (2) The nonlinear tracker was integrated directly into the collision avoidance logic. With the use of the Fast-Time Encounter Generator (FTEG), a comparative study of performance with the nonlinear tracker versus the alpha-beta tracker was made. (3) Selected live flight test encounters were used to analyze the relative performance of the alpha-beta tracker versus the nonlinear tracker. The stand-alone analysis revealed that the nonlinear tracker consistently had smaller maximal errors in vertical rate estimation and a smaller transient rate response delay than did the alpha-beta tracker. Both the live flight test encounter simulations and the FTEG scenario simulation indicated that nonlinear tracking often caused an increase in separation for encounters with vertically accelerating threats and reduced occurrences of incorrect command sense choice. Author (GRA)

N82-19198# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
FAA STATISTICAL HANDBOOK OF AVIATION Annual Report, period ending 31 Dec. 1980
31 Dec. 1980 183 p
(AD-A109289) Avail: NTIS HC A09/MF A01 CSCL 01/2

This report presents statistical information pertaining to the Federal Aviation Administration, The National Airspace System, Airports, Airport Activity, U.S. Civil Air Carrier Fleet, U.S. Civil Air Carrier Operating Data, Airmen, General Aviation Aircraft, Aircraft Accidents, and a Glossary of the terms used in this publication. Author (GRA)

N82-19199# Aeronautical Research Labs., Melbourne (Australia).
DISENGAGEMENT OF SAFETY HARNESS BUCKLES - CT4 Report, Aug. - Dec. 1979
S. R. Sarrailhe and G. A. Thomas Mar. 1981 25 p
(AD-A109048; ARL/STRUC-NOTE-469) Avail: NTIS HC A02/MF A01 CSCL 13/12

During the crash of a CT4 Airtrainer in August, 1979 both safety harness buckles disengaged. The crash was very severe but the harnesses did not show signs of overloading. After a series of tests it was concluded that the buckles disengaged because of misalignment of the loads onto the buckle. This misalignment may not be represented in the standard test procedures and they may give a false sense of security. New

tests are proposed, but further work would be desirable to establish design and test criteria. Author (GRA)

N82-19156# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ELECTRICAL GROUND TESTING OF AIRCRAFT ANTISTATIC PROTECTION
A. Bruere *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 47-56 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 187-196 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-19200 Virginia Univ., Charlottesville.
OPTIMAL AIRCRAFT LANDING PATTERNS FOR MINIMAL NOISE IMPACT Ph.D. Thesis
Robert Chi-Tuan Chang 1981 183 p
Avail: Univ. Microfilms Order No. 8129300

A total system to perform the task of optimizing aircraft landing trajectories with respect to aircraft noise annoyance in the area near airports was developed. The noise annoyance considered was solely due to aircraft. Multiple aircraft on multiple landing paths were studied by the total system developed. While many of the subsystems such as the aircraft noise signature model, annoyance model, optimization methods, etc. already existed, the task was to combine all these together into a single working system. The various subsystems included an annoyance model (aircraft noise signature model, population model, impact intensity weighting function), formulation of aircraft landing paths and constraints, performance measure, and optimization. A single numerical number, noise impact index, which represents the average severity of noise impact over the entire population of a community was adopted as the annoyance index. Dissert. Abstr.

N82-19201# Committee on Science and Technology (U. S. House).
AIRCRAFT COLLISION AVOIDANCE SYSTEMS
Washington GPO 1981 443 p refs Hearings before the Subcomm. on Transportation, Aviation and Mater. of the Comm. on Sci. and Technol., 97th Congr. 1st Sess., No. 5, 31 Mar. and 3 Apr. 1981
(GPO-79-431) Avail: Subcommittee on Transportation, Aviation and Materials

Midair collision avoidance systems, especially the beacon collision avoidance system is discussed. Magazine articles, letters, and statements of government and industry personnel are included. R.J.F.

N82-19202# Committee on Science and Technology (U. S. House).
AIR TRAFFIC CONTROL EN ROUTE COMPUTER SYSTEM
Washington GPO 1981 10 p Rept. to accompany H.R. 202 presented by the Comm. on Sci. and Technol., 97th Congr., 1st Sess., 14 Oct. 1981
(GPO-89-008; H-Rept-97-271) Avail: US Capitol, House Document Room

Amendments to the House Resolution requiring the Administrator of the FAA to submit full research and development program planning documentation to the Committee with respect to the modernization and replacement of the en route computer system are presented. Background material included covers the current ATC system as well as the justification, benefits, costs, and acquisition strategy for replacing the computer. It is recommended the FAA establish a mechanism whereby the judgements and experience of operating personnel and users of the air system be included in the en route computer development process. A.R.H.

N82-19203# Mitre Corp., McLean, Va.
ACTIVE BEACON COLLISION AVOIDANCE SYSTEM (BCAS) LOGIC PERFORMANCE DURING OPERATIONAL FLIGHT TESTS Report, 13 Jul. - 9 Sep. 1980
R. A. Tornese and A. L. McFarland Washington FAA Jan. 1981 123 p refs
(Contract DTFA01-81-C-10001)
(AD-A108893; MTR-80/W352; FAA-RD-80-138) Avail: NTIS HC A06/MF A01 CSCL 17/7

Between 13 July and 9 September 1980, operational flight tests of an Active BCAS Experimental Unit (BEU) were conducted. The flight tests included 129 approaches to 28 different airports during 60 hours of flight: 14 unplanned encounters which gave rise to BCAS alerts were recorded. In each of the encounters, the aircraft carrying the BEU came into a conflict with another aircraft entirely by chance. The other aircraft was not associated with the BCAS test program in any way. The primary purpose of the flight tests was to determine how many unplanned alerts would occur during normal flight operations and to assess whether each was a desirable or unwanted alert. In addition, alert correctness, timeliness, and utility were considered along with the potential impact of BCAS on the ATC system. The data was also used to determine approximately the region(s) where desensitization of BCAS threat logic should be applied to limit unwanted alerts. GRA

N82-19204# National Ocean Survey, Rockville, Md.
UNITED STATES COAST PILOT 2. ATLANTIC COAST: CAPE COD TO SANDY HOOK, 16TH EDITION
Jan. 1981 323 p refs
(PB82-109505; NOAA-81021106) Avail: NTIS HC A14/MF A01 CSCL 17G

Coast Pilots supplement the navigation information shown on the nautical charts and are based upon field inspection conducted by the National Ocean Survey. Most of this book information cannot be shown graphically on the standard nautical charts and is not readily available elsewhere. Coast Pilot subjects include navigation regulations, outstanding landmarks, channel and anchorage peculiarities, dangers, weather, ice, freshets, routes, pilotage, and port facilities. Information is included on: Cape Cod to Sandy Hook, Outer Cape Cod and Nantucket Sound, Vineyard Sound and Buzzards Bay, Narragansett Bay, Block Island Sound, Eastern Long Island Sound, Western Long Island Sound, South Coast of Long Island, New York Harbor, and Hudson River. GRA

N82-20126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GLOBAL POSITIONING SYSTEM TIMING RECEIVERS IN THE DSN
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 90-99 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17G

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-19205*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VEHICLE TEST REPORT: BATTRONIC PICKUP TRUCK
Theodore W. Price, Thomas W. Shain, Raymond J. Freeman, and Michael F. Pompa 1 Jan. 1982 47 p refs
(Contracts NAS7-100; DE-AI01-78CS-54209)
(NASA-CR-168637; JPL-Pub-82-8; DOE/CS-54209/6) Avail: NTIS HC A03/MF A01 CSCL 13F

An electric pickup truck was tested to characterize certain parameters and to provide baseline data that can be used for the comparison of improved batteries that may be incorporated into the vehicle at a later time. The vehicle tests were concentrated on the electrical drive subsystem; i.e., the batteries, controller, and motor. The tests included coastdowns to characterize the road load and range evaluations for both cyclic and constant speed conditions. A qualitative evaluation of the vehicle's performance was made by comparing its constant speed range performance with other vehicles. S.L.

N82-19206# Canyon Research Group, Inc., Westlake Village, Calif.

DESCENT-RATE CUING FOR CARRIER LANDINGS: EFFECTS OF DISPLAY GAIN, DISPLAY NOISE AND AIRCRAFT TYPE Interim Report, 1 May 1980 - 30 Nov. 1981

Gavan Lintern, Daniel J. Sheppard, and Charles E. Kaul Oct. 1981 42 p refs

(Contract N61339-78-C-0060)

(AD-A108801; TR-81-015; NAVTRAEQUIPCEN-78-C-0060-8) Avail: NTIS HC A03/MF A01 CSCL 01/2

Two studies are reported concerning the utility of modifying a conventional Fresnel Lens Optical Landing System (FLOLS) to include variable-length vertical light arrays, or arrows, in order to provide descent-rate information to pilots making carrier landings. In the first study, the Descent-Rate Cuing (DRC) algorithm incorporated an angular gain to provide glideslope displacement information. The DRC system did not significantly improve glideslope tracking performance. Lineup performance was not adversely affected. The effects of aircraft type and noise on the DRC were also examined. In the second study, the DRC algorithm incorporated a modified linear gain to provide glideslope displacement information. The DRC system consistently reduced glideslope error throughout the approach. Comparison of the data and previous research suggests that a DRC system incorporating a linear gain can produce a strong and consistent improvement in glideslope control in carrier landings. Author (GRA)

N82-19207# Federal Aviation Administration, Atlantic City, N.J.

TRANSPORT AIRCRAFT COCKPIT STANDARDIZATION (FEDERAL AVIATION REGULATIONS PART 25) Final Report

Richard Sulzer Nov. 1981 42 p

(FAA Proj. 161-200-130)

(AD-A108924; FAA-CT-80-54; FAA-EM-81-11) Avail: NTIS HC A03/MF A01 CSCL 01/3

The present status of transport aircraft cockpit standardization was evaluated by examination of regulations and other design practice documents and by interviews with airline pilots and engineers. Flight critical areas most in need of increased standardization were identified as (1) primary flight guidance instrumentation and (2) pilot input keyboards. Additional areas proposed for further industry consultation, possibly leading to further standardization at a future date, include flap, slat, and leading-edge device control and display systems; indicated airspeed (IAS)-Mach indicators; powerplant instrumentation; and electric and hydraulic power diagrams, displays, and controls. The continued use of a mixed metric and English unit measurement plan in both United States and foreign manufactured aircraft is noted, and the incidence of pilot dual qualifications and the need for criteria for digital system software certification are also discussed. GRA

N82-19208# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate of Development and Qualification.

HELICOPTER ICING SPRAY SYSTEM (HISS) NOZZLE IMPROVEMENT EVALUATION Final Report

Daumants Belte Sep. 1981 53 p refs

(AD-A109405; USAAEFA-79-02-2) Avail: NTIS HC A04/MF A01 CSCL 01/2

The U.S. Army Aviation Engineering Flight Activity (USAAEFA) operates a modified CH-47C helicopter as an airborne spray tanker to create a simulated icing test environment. This system was modified to improve its spray cloud characteristics with respect to uniformity of liquid water content (LWC) and reduction of drop size median volumetric diameter (MVD). The existing atomizers on the spray boom assembly were replaced by Sonic Development Corporation model 125-H 'Sonicore' nozzles. A UH-1H helicopter equipped with particle measuring spectrometers conducted in-flight sampling and calibration of a modified HISS spray cloud in conjunction with other helicopter icing tests. Average cross sectional dimensions of the present spray cloud was estimated as 36 ft wide and 8 ft deep. Usable values of cloud LWC in excess of 1 gram per cubic meter with a drop size MVD range of 20 to 35 microns can be generated at a 90 knot airspeed. GRA

N82-19209# Kaman Aerospace Corp., Bloomfield, Conn.

DEVELOPMENT OF MANUFACTURING TECHNOLOGY FOR FABRICATION OF A COMPOSITE HELICOPTER MAIN ROTOR SPAR BY TUBULAR BRAIDING Final Report, Sep. 1978 - Sep. 1980

Mark L. White St. Louis, Mo. Army Aviation Research and Development Command Apr. 1981 81 p refs

(Contract DAAG46-78-C-0070)

(AD-A109377; R-1618; AVRADCOM-TR-81-F-9) Avail: NTIS HC A05/MF A01 CSCL 11/4

Mechanical tubular braiding has been shown to be a viable blade spar manufacturing process in a program which included preliminary design of an improved main rotor blade for the OH-58 helicopter. The blade incorporates an advanced aerodynamic shape and has as its primary structural member a Kevlar 49/epoxy spar fabricated by braiding. Achievement of an analytically acceptable blade and spar design meeting critical structural and dynamic requirements was not hindered by braiding process constraints. Mechanical property tests of flat panels and spar sections exhibited excellent correlation with analytical predictions, substantiating the applicability of normal composite laminate analysis methods and the validity of the specific design. Ballistic testing of spar sections demonstrated superior containment of structural damage compared to composite spars produced by more conventional methods. Manufacturing cost estimates predict a price reduction of 1/3 for the braided spar relative to a similar S-glass/epoxy spar for an OH-58 blade of identical external shape fabricated by orthodox, low-cost technology.Author (GRA)

N82-19210# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

EXPERIENCE DURING THE DEVELOPMENT OF THE GERMAN-JAPANESE HELICOPTER BK 117 [ERFAHRUNGEN WAEHREND DER ENTWICKLUNG DES DEUTSCH-JAPANISCHEN HUBSCHRAUBERS BK 117]

Klaus Szczeponik and Hans Fabian 1981 17 p In GERMAN Presented at DGLR Jahrestagung, Brunwick, 1980

(MBB-UD-318-81-O) Avail: NTIS HC A02/MF A01

The German-Japanese colaboration in building the BK 117 helicopter is described. The exchange of know-how, information dissemination, telecommunication, and technical expertese, are enumerated. It is shown that since international cooperation is possible, the German industries should be able to exchange and cooperate in the development of new products. Transl. by E.A.K.

N82-19211# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

PERSPECTIVES FOR CONTROLLED WEAPONS TECHNOLOGY: REPORT OF THE 90TH HELICOPTER FORUM [PERSPEKTIVEN DER LENKWAFFENTECHNIK FUER DIE 90ER JAHRE VORTRAGE VOR DEM HUBSCHRAUBER FORUM BUECKEBURG]

D. Weis 2 May 1980 13 p In GERMAN Forum held in Bueckeburg, West Germany, 5-7 May, 1980

(MBB-UA-532-80-O) Avail: NTIS HC A02/MF A01

A general forecasting for the essential guided missile system technology in the 1990s is presented. The development of armored guided missiles since its conception in 1955, and an outline of goals and trends of armored defense for the near and far future are presented. Possibilities of acceleration in mission accomplishments of future armored defensive weapon systems are examined. Transl. by E.A.K.

N82-19212# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.

A METHOD FOR APPLYING LINEAR OPTIMAL CONTROL THEORY TO THE DESIGN OF A REGULATOR FOR A FLEXIBLE AIRCRAFT

L. J. J. Erkelens and J. L. Simons 31 Mar. 1980 83 p refs Previously announced as NLR-TR-75118-C Sponsored by Directorate of Material Air RNLAF
(NLR-TR-80032-U; NLR-TR-75118-C) Avail: NTIS HC A05/MF A01

A hypothetical control system that provides improved rigid body and structural mode damping of a flexible aircraft in order to improve the riding quality and minimize the wing bending moment during flight in turbulence, is considered. The equations of motion are related to a high performance fighter aircraft with external stores. The feedback gains are determined, using linear optimal control theory. A quadratic optimization criterion, taking into account the normal acceleration at the pilot seat and the wing root bending moment, is used. A number of optimal and suboptimal regulators are calculated. The system performance is expressed in terms of pole location, frequency response, and power spectra for both pilot seat acceleration and wing root bending moment. Aircraft response to a deterministic gust disturbance is presented. Author (ESA)

N82-19213# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
ON THE DESIGN OF SOME AIRFOILS FOR SAILPLANE APPLICATION
L. M. M. Boermans and H. J. W. Selen Apr. 1981 47 p refs Presented at 17th OSTIV Congr., Paderborn, West Germany, 1981
(VTH-LR-326) Avail: NTIS HC A03/MF A01

Airfoils were designed such that, by adding material to the surface, an existing wing could be modified and tested in flight. Wind tunnel experiments on inner and outer wing segments are described, giving information on the quality of actual airfoils achieved in serial production and of the LSL airfoil analysis and design computer program. The characteristics of several modern airfoils used in standard class sailplanes are analyzed and typical differences in the case of smooth surface and of rough leading edge are clarified. Wind tunnel measurements with real insect remains on a wing segment are compared with a well known simulated bug pattern and shown to have greatly different drag characteristics. The application of pneumatic turbulators to reduce the drag of an airfoil is discussed. The computer program was used to modify the wing of an ASW-193 sailplane. Flight tests are satisfactory. Author (ESA)

N82-19214# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A FURTHER STUDY OF HELICOPTER ROTOR PITCH-FLAP-PHASE COUPLING B.S. Thesis
A. East and N. S. Sehmi Jun. 1981 81 p refs
(BU-259) Avail: NTIS HC A05/MF A01

Pitch-flap phase coupling between the blades of a helicopter rotor was studied in order to improve overall aircraft stability. A mathematical model was constructed for the Westland Lynx helicopter, which incorporates a semiarticulated rotor head. Full expressions are derived in a lengthy, but accurate fashion for the blade flapping motion as well as for rotor hub forces and moments. The rotor state defined is believed to be more accurate than that of any previous, known treatment. Pitch-flap phase coupling of the form: blade pitch angle at rotor center line - blade pitch control angle + pitch-flap coupling gain (blade flap angle + pitch-flap-phase coupling lead/lag), is introduced. The effect on the rotor derivatives is given with change in phase lead/lag angle and control gain. A full six degrees of freedom model is extensively used for the study of stability, with the results beset with problems which are discussed. Author (ESA)

N82-19215# Bristol Univ. (England). Dept. of Aeronautical Engineering.
A DESIGN STUDY OF THE MARSHAL B.S. Thesis
D. Suen and G. H. Tan Jun. 1981 55 p refs
(BU-262) Avail: NTIS HC A04/MF A01

The feasibility of a six seat variant of the Britten Sheriff twin-engined aircraft, the Marshal, was studied. Results show that the Marshal, powered by two 200 h.p. engines and at an all-up-weight (AUW) of 3550 lb, can compete in the open market, both in terms of performance and price. No major structural alterations, except on the fuselage to accommodate two additional passengers, are envisaged. This aircraft is expected to be suitable for a touring role. For business flying, a high cruise speed is favored and so a turbocharged version was also considered. The performance level attainable, with two 200 h.p. turbocharged engines, compares well with the competition. However, at an AUW of 3700 lb, certain modifications to the wing are necessary. The indication is that the Marshal is a commercially viable project. Author (ESA)

N82-19216# Bristol Univ. (England). Dept. of Aeronautical Engineering.
DESIGN STUDY INTO A HIGH ENDURANCE MINI-ROTORCRAFT B.S. Thesis
D. A. E. Beedell and J. C. Hendy Jun. 1981 71 p refs Original contains color illustrations
(BU-265) Avail: NTIS HC A04/MF A01

Competing models in a minirotorcraft competition for maximum endurance with an all up weight no greater than 5 kg, must fly above a height of 5 m within an area 10 m square are discussed. A design in which aerodynamics, stability and control, and mechanical and structural aspects are considered to obtain the size and angular velocity of the rotor for minimum power, while sufficient stability and control for a long flight are still inherent in the overall system is presented. Weights of individual components are also examined. It is found that a rotor mounted engine configuration, with rotor radius about 1.6 m and rotational velocity 4 to 5 revs/sec, with engines half way along the rotors and with Hiller control rotors, is the most promising design. The possible endurance is some 12 hr and hence pilot error and mechanical failure become deciding factors. Author (ESA)

N82-19140*# AiResearch Mfg. Co., Torrance, Calif.
ELECTRIC ECS
Dale O. Moeller *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 147-154 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19141*# Hamilton Standard, Windsor Locks, Conn.
ENVIRONMENTAL CONTROL SYSTEMS
Fred M. Rosenbush *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 155-188 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19142*# Honeywell, Inc., Clearwater, Fla.
OVERVIEW OF HONEYWELL ELECTROMECHANICAL ACTUATION PROGRAMS
Charles Wyllie *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 163-187 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19146*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POWER SYSTEMS
Robert Finke *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 241-246 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-19217*# Mitre Corp., McLean, Va.
A CONCEPT FOR A FUEL EFFICIENT FLIGHT PLANNING AID FOR GENERAL AVIATION Final Report
B. P. Collins, A. L. Haines, and C. J. Wales Washington NASA Mar. 1982 96 p refs
(Contract NAS1-16430)
(NASA-CR-3533; MTR-81W233) Avail: NTIS HC A05/MF A01 CSCL 01D

A core equation for estimation of fuel burn from path profile data was developed. This equation was used as a necessary ingredient in a dynamic program to define a fuel efficient flight path. The resultant algorithm is oriented toward use by general aviation. The pilot provides a description of the desired ground track, standard aircraft parameters, and weather at selected waypoints. The algorithm then derives the fuel efficient altitudes and velocities at the waypoints. B.W.

N82-19218# Institute for Defense Analyses, Arlington, Va.
ASSESSMENT OF AVIONIC EQUIPMENT FIELD RELIABILITY AND MAINTAINABILITY AS FUNCTIONS OF UNIT COST
Mark I. Knapp and Joseph W. Stahl 7 Oct. 1981 24 p refs Presented at the 16th Ann. Dept. of Defense Cost Analysis Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109373) Avail: NTIS HC A02/MF A01 CSCL 01/3

Pound-for-pound, avionics is generally recognized as the most expensive, complex and sophisticated part of an aircraft. Reliability and maintainability are critical characteristics that influence spares provisioning, maintenance resource requirements, system operational availability and, ultimately, investment and operating costs. Consequently, much attention has been focused upon improving the reliability and maintainability of avionics which, in the past, have been disappointingly low. This paper addresses avionics reliability and maintainability. The analysis was performed last year in partial response to a request of IDA by OASD (C(3)I) to provide information for use by DSARC principals at the Full-Scale Development milestone. Since the 5000 series of DoD Directives and Instructions emphasize analytical comparisons of any new systems under consideration by the DSARC with current, comparable systems, we undertook analyses to determine if there may be one or more historical relationships between field reliability and maintainability and avionic equipment characteristics that would assist in forecasting those attributes. GRA

N82-19219# European Space Agency, Paris (France).
EQUIPMENT FOR TESTING AND MEASURING A 'HELMET MOUNTED SIGHT AND DISPLAY' SYSTEM WITH A COUPLED MOVABLE TV CAMERA IN THE FLIGHT SIMULATOR FOR RESEARCH OF THE DFVLR
Friedrich Erdmann, R. Dierke, E. Biertuempel, R. Ehlers, and H. Loehr Nov. 1981 70 p refs Transl. into ENGLISH of "Ein Versuchsaufbau zum Ausmessen eines 'Helmet Mounted Sight/Display' mit Nachgeschaltetem Kameraschwenkrahmen im Forschungsflugsimulator der DFVLR" Rept. DFVLR-Mitt-80-04 DFVLR, Brunswick, Jan. 1980 Original report in GERMAN previously announced as ESA-95301
(ESA-TT-675; DFVLR-Mitt-80-04) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 17.40

A test installation capable of static and dynamic measurements on a helmet mounted sight and display (HMS/D) during simulated helicopter motion, by means of a steerable camera rotation framework was built. The rotation frame is gyro controlled and moves about two axes (in pitch and yaw). The HMS/D generates the helmet line of sight referred to the simulator platform (the aircraft based system) in terms of azimuth and elevation. Through the helmet mounted display, using a semitransparent mirror, an electronically produced cross hair (the helmet mounted sight) is superimposed on the image in the right eye of the pilot. The TV picture is also reflected into his eye, enabling him to aim at a target on the sensor image. Test equipment accuracy is 40 min in azimuth, 20 min in elevation. Author (ESA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-19220*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DILUTION JET BEHAVIOR IN THE TURN SECTION OF A REVERSE FLOW COMBUSTER
Steven M. Riddlebaugh, Abraham Lipshitz (Ahuza, Haifa, Israel), and Isaac Greber (Case Western Reserve Univ., Cleveland, Ohio) Jan. 1982 15 p refs Presented at the 20th Aerospace Sci. Meeting, Orlando, Fla., 10-14 Jan. 1982; sponsored by AIAA (NASA-TM-82776; E-1107; AIAA-82-0192) Avail: NTIS HC A02/MF A01 CSCL 21E

Measurements of the temperature field produced by a single jet and a row of dilution jets issued into a reverse flow combustor are presented. The temperature measurements are presented in the form of consecutive normalized temperature profiles, and jet trajectories. Single jet trajectories were swept toward the inner wall of the turn, whether injection was from the inner or outer wall. This behavior is explained by the radially inward velocity component necessary to support irrotational flow through the turn. Comparison between experimental results and model calculations showed poor agreement due to the model's not including the radial velocity component. A widely spaced row of jets produced trajectories similar to single jets at similar test conditions, but as spacing ratio was reduced, penetration was reduced to the point where the dilution jet flow attached to the wall. Author

N82-19221*# Garrett Turbine Engine Co., Phoenix, Ariz.
COOLED VARIABLE-AREA RADIAL TURBINE TECHNOLOGY PROGRAM Final Report
G. D. Large and L. J. Meyer Jan. 1982 303 p refs
(Contract NAS3-22004)
(NASA-CR-165408) Avail: NTIS HC A14/MF A01 CSCL 21E

The objective of this study was a conceptual evaluation and design analyses of a cooled variable-area radial turbine capable of maintaining nearly constant high efficiency when operated at a constant speed and pressure ratio over a range of flows corresponding to 50- to 100-percent maximum engine power. The results showed that a 1589K (2400 F) turbine was feasible that would satisfy a 4000-hour duty cycle life goal. The final design feasibility is based on 1988 material technology goals. A peak aerodynamic stage total efficiency of 0.88 was predicted at 100 percent power. Two candidate stators were identified: an articulated trailing-edge and a locally movable sidewall. Both concepts must be experimentally evaluated to determine the optimum configuration. A follow-on test program is proposed for this evaluation. Author

N82-19222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.78, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82
Royce D. Moore and Lonnie Reid Feb. 1982 112 p refs
(NASA-TP-1974; E-259) Avail: NTIS HC A06/MF A01 CSCL 21E

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating flow range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 1.82 at a flow 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the stage achieved a peak efficiency of 0.821 at a pressure ratio of 1.817. The stage stall margin at design speed based on conditions at stall and peak efficiency was about 11 percent. Author

N82-19136*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
A PROPULSION VIEW OF THE ALL-ELECTRIC AIRPLANE
Robert P. Wagner *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 95-102 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

N82-19137*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
POTENTIAL PROPULSION CONSIDERATIONS AND STUDY

AREAS FOR ALL-ELECTRIC AIRCRAFT
Thomas G. Lenox *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 103-112 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

N82-19138*# Westinghouse Electric Corp., Lima, Ohio. Air All-Electronics Div.
A LOOK INTO THE FUTURE: THE POTENTIAL OF THE ALL-ELECTRIC SECONDARY POWER SYSTEM FOR THE ENERGY EFFICIENT TRANSPORT
Alan E. King *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 113-124 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19145*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENGINE TECHNOLOGY
Anthony C. Hoffman *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 235-240 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 21E

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-19223 Royal Aircraft Establishment, Farnborough (England).
A CRITERION FOR THE PREDICTION OF THE RECOVERY CHARACTERISTICS OF SPINNING AIRCRAFT
T. H. Kerr 1981 24 p refs
(RAE-TN-AERO-2251) Copyright. Avail: Issuing Activity

Full scale spinning tests were analyzed in order to produce a recovery estimation method for straight and swept wing aircraft. The rate of rotation about spin axis X wing span/true rate of descent in ft/sec, was estimated from the general layout and loading of the aircraft. Antispin rolling moment coefficient (wind axis) due to the body at a mean incidence of 45 deg and antispin moment due to the movement of the rudder from neutral to fully antispin were calculated. The unbalanced (antispin) rolling moment coefficient is derived. This is plotted against (I- (pitching moment of inertia/rolling moment of inertia)) and whether the aircraft is likely to have a satisfactory spin recovery characteristic is assessed by reference to the empirical boundary tables provided. Data for Spitfire and Hurricane aircraft are provided. Recovery standards improve as pitching moment of inertia/rolling moment of inertia increases. Author (ESA)

N82-19224*# Pennsylvania State Univ., University Park. Dept. of Aerospace Engineering.
AN EXPERIMENTAL STUDY OF THE EFFECT OF TAIL CONFIGURATION ON THE SPINNING CHARACTERISTICS OF GENERAL AVIATION AIRCRAFT M.S. Thesis
Mark G. Ballin Mar. 1982 182 p refs
(Grant NAG1-73)
(NASA-CR-168578) Avail: NTIS HC A09/MF A01 CSCL 01C

The feasibility of using static wind tunnel tests to obtain information about spin damping characteristics of an isolated general aviation aircraft tail was investigated. A representative tail section was oriented to the tunnel free streamline at angles simulating an equilibrium spin. A full range of normally encountered spin conditions was employed. Results of parametric studies performed to determine the effect of spin damping on several tail design parameters show satisfactory agreement with NASA rotary balance tests. Wing and body interference effects are present in the NASA studies at steep spin attitudes, but agreement improves with increasing pitch angle and spin rate, suggesting that rotational flow effects are minimal. Vertical position of the horizontal stabilizer is found to be a primary parameter affecting yaw damping, and horizontal tail chordwise position induces a substantial effect on pitching moment. A.R.H.

N82-19225*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATOR STUDY OF VORTEX ENCOUNTERS BY A TWIN-ENGINE, COMMERCIAL, JET TRANSPORT AIRPLANE
Earl C. Hastings, Jr. and Gerald L. Keyser, Jr. Feb. 1982 65 p refs
(NASA-TP-1966; L-14187) Avail: NTIS HC A04/MF A01 CSCL 01C

A simulator study of vortex encounters was conducted for a twin-engine, commercial, jet transport airplane encountering the vortex flow field of a heavy, four-engine, commercial, jet transport airplane in the final-approach configuration. The encounters were conducted with fixed controls and with a pilot using a state-of-the-art, manual-control system. Piloted encounters with the base-line vortex flow field out of ground effect (unattenuated) resulted in initial bank-angle excursions greater than 40 deg, coupled with initial sideslip-angle excursions greater than 10 deg. The severity of these initial upsets was significantly reduced when the vortex center was moved laterally or vertically away from the flight path of the encountering airplane. Smaller reductions occurred when the flow field was attenuated by the flight spoilers on the generating airplane. The largest reduction in the severity of the initial upsets, however, was from aging in ground effect. The severity of the initial upsets of the following airplane was relatively unaffected by the approach speed. Increasing the lift coefficient of the generating airplane resulted in an increase in the severity of the initial upsets. Author

N82-19226*# Boeing Aerospace Co., Kent, Wash.
A STUDY OF FLIGHT CONTROL REQUIREMENTS FOR ADVANCED, WINGED, EARTH-TO-ORBIT VEHICLES WITH FAR-AFT CENTER-OF-GRAVITY LOCATIONS Final Report
Andrew K. Hepler, Howard Zeck, William H. Walker, and Alexander Polack Washington NASA Feb. 1982 121 p
(Contract NAS1-16128)
(NASA-CR-3491) Avail: NTIS HC A06/MF A01 CSCL 01C

Control requirements of Controlled Configured Design Approach vehicles with far-aft center of gravity locations are studied. The baseline system investigated is a fully reusable vertical takeoff/horizontal landing single stage-to-orbit vehicle with mission requirements similar to that of the space shuttle vehicle. Evaluations were made to determine dynamic stability boundaries, time responses, trim control, operational center-of-gravity limits, and flight control subsystem design requirements. Study tasks included a baseline vehicle analysis, an aft center of gravity study, a payload size study, and a technology assessment.
Author

N82-19227# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
FLUTTER AND TIME RESPONSE ANALYSES OF THREE DEGREE OF FREEDOM AIRFOILS IN TRANSONIC FLOW Final Report, Nov. 1979 - Dec. 1980
T. Y. Yang and C. H. Chen Wright-Patterson AFB, Ohio AFAWL Aug. 1981 60 p refs
(Grant AF-AFOSR-3523-78; AF Proj. 2307)
(AD-A108987; AFWAL-TR-81-3103) Avail: NTIS HC A04/MF A01 CSCL 20/4

Flutter and time response analyses are performed for a NACA 64A006 conventional and a MBB A-3 supercritical airfoil, both oscillating with plunge, pitch, and aileron pitch d.o.f.'s in small disturbance, transonic flow. The aerodynamic coefficients are calculated using the transonic code LTRAN2-NLR. The effects of various kinds of aeroelastic parameters on flutter speeds for the bending-torsion, bending-aileron, and torsion-aileron branches are studied. The flutter speeds associated with the bending-torsion branch are plotted against Mach number for different parameter values. The flutter speed, the amplitude ratio, and the phase difference at different Mach numbers are plotted against the mass ratio for both of two d.o.f. and a three d.o.f. case. Time-response results are obtained for the NACA 64A006 and the MBB A-3 airfoils at M = 0.85 and 0.765, respectively. Using the same sets of parameter values, the flight speeds used to obtain all the neutrally stable response are very close to the flutter speeds obtained in the flutter analysis. The principle of linear superposition of airloads is used in the flutter analysis but not in the response analysis. Author (GRA)

N82-19228# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
ACTIVE GUST AND MANEUVER LOAD CONTROL CONCEPTS WITH THE EXAMPLE OF THE AIRBUS A300. PART 1: EXPLANATION OF A REGULAR IN THE TIME ZONE OF WIND GUST LOAD DECREASE AND EXAMINATION OF ITS EFFECTIVENESS IN STOCHASTIC GUSTS [AKTIVE BOEEN- UND MANOEVERLASTREGELUNGSKONZEPTE AM BEISPIEL DES AIRBUS A-300. TEILL: AUSLEGUNG EINES REGLERS IM ZEITBEREICH ZUR BOENLASTMINDERUNG UND NACHPRUEFUNG DER WIRKSAMKEIT FUER STOCHASTISCHE BOEEN]
J. Becker, O. Sensburg, and F. Weiss 28 Apr. 1981 60 p refs In GERMAN Presented at DGLR-Jahrestagung 1981, Aachen, 11-14 May, 1981
(MBB-FE-172/S/PUB/39-Pt-1) Avail: NTIS HC A04/MF A01

The development of active control technology and its application to flutter stabilization in aviation as well as maneuvering squall load control In the structural reduction and improvement of flying comfort was investigated. The design of the squall load control, and the plotting of the simulation model for the flexible airplane are examined. Transl. by E.A.K.

N82-19135*# Lockheed-California Co., Burbank.
ELECTRIC FLIGHT SYSTEMS, OVERVIEW
Michael J. Cronin *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 61-94 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19143*# Rockwell International Corp., Cedar Rapids, Iowa.
DIGITAL FLIGHT CONTROLS
John C. Hall *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 189-212 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19148*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
ELECTROMECHANICAL ACTUATORS
James Bigham *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 253-258 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIGITAL FLIGHT CONTROLS
Billy Dove *In its* Elec. Flight Systems Feb. 1982 p 259-261 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTRIC FLIGHT SYSTEMS INTEGRATION
Ray V. Hood *In its* Elec. Flight Systems Feb. 1982 p 263-268 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 01C

N82-19154# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
MULTIVARIABLE AIRCRAFT CONTROL BY MANEUVER COMMANDS: AN APPLICATION TO AIR TO SURFACE GUNNERY
Binh DangVu *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 9-19 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 149-159 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N82-19229*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE AEROSPACE TECHNOLOGY LABORATORY (A PERSPECTIVE, THEN AND NOW)
James F. Connors and Robert G. Hoffman Feb. 1982 21 p refs
(NASA-TM-82754; E-1070) Avail: NTIS HC A02/MF A01 CSCL 14B

The physical changes that have taken place in aerospace facilities since the Wright brothers' accomplishment 78 years ago are highlighted. For illustrative purposes some of the technical facilities and operations of the NASA Lewis Research Center are described. These simulation facilities were designed to support research and technology studies in aerospace propulsion. Author

N82-19230# Navy Experimental Diving Unit, Panama City, Fla. Ocean Simulation Facility.
COST ANALYSIS OF NEDU'S HELIUM RECLAIMER
Eric Randall Sep. 1981 31 p refs
(AD-A108409; NEDU-9-81) Avail: NTIS HC A03/MF A01 CSCL 14/2

The analysis compares the cost effectiveness of reclaiming helium from the Navy Experimental Diving Unit's (NEDU) Ocean Simulation Facility (OSF) Hyperbaric Chamber Complex using a Helium Reclamation System manufactured by DIVETEC Systems, Inc. to purchasing pure helium from the U.S. Department of the Interior Bureau of Mines. The cost of electrical power, maintenance and upgrade of the Helium Reclaim System is considered along with the effects of various inflation rates. A discounted cash flow analysis is provided. GRA

N82-19231# Bristol Univ. (England). Dept. of Aeronautical Engineering.
THE PRESSURE SIGNATURE METHOD FOR BLOCKAGE CORRECTIONS, AND ITS APPLICATIONS TO THE INDUSTRIAL WIND TUNNEL B.S. Thesis
A. S. Walker and N. P. Wiseman Jun. 1981 43 p refs
(BU-263) Avail: NTIS HC A03/MF A01

A recent method of correcting for errors due to blockage, applicable to complex shapes and high blockage ratios, was applied to the Aeronautical Engineering Department industrial wind tunnel. A tunnel centerline, source-sink distribution was derived from measured wall pressure signatures. The interference effect of the tunnel walls was calculated; blockage corrections were applied to in-tunnel measurements of forces and pressures. The drag coefficient of a normal flat plate of deliberately high blockage ratio (12%) was measured in the tunnel, then corrected to the value in unconfined flow. This is found to be close to the expected value and indicates that the pressure signature method can be reliably used to correct measurements obtained from models, up to this value of blockage. The effective body implied by the equivalent potential flow was also calculated. This compares well with the known effective body shapes of flat normal plates in confined flow. Author (ESA)

N82-19158# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
INDUCTION DRIVEN TRANSONIC WIND TUNNEL T2: OPERATION AT ROOM TEMPERATURE AND CRYOGENIC ADAPTATION
A. Mignosi, D. Faulmann, and A. Seraudie *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 63-74 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 203-215 (For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N82-19232* National Aeronautics and Space Administration, Washington, D. C.
STUDENT'S EXPERIMENT TO FLY ON THIRD SHUTTLE MISSION
24 Feb. 1982 25 p refs
(NASA-News-Release-82-27; P82-10027) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

A spaceborne student experiment on insect motion during weightlessness scheduled to fly on the third flight of the space shuttle is described. The experiment will focus on the flight behavior in zero gravity of two species of flying insects with differing ratios of body mass to wing area, the velvetbean caterpillar moth and the honeybee drone. Ten insects of each species will be carried in separate canisters. The crew will remove the canisters from the storage locker and attach them to the mid-deck wall, where the insects will be observed and filmed by a data acquisition camera. R.J.F.

N82-19233*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. MLR FLIGHT EQUIPMENT INSTALLED IN THE ORBITER CABIN
[1982] 13 p
(NASA-TM-84153; E-420-03-82-02) Avail: NTIS HC A02/MF A01 CSCL 22A

The monodisperse latex reactor (MLR), a materials processing payload, located in the middeck of the orbiter cabin, which will operate for 12 hours, is discussed. The capability of the MLR system to support experiments in the middeck area, and to study the kinetics of chemical reactions without the effects of buoyance and sedimentation will be demonstrated. Critical parameters required to understand the mechanism for large particle size monodisperse latex formation using seed latex are studied. E.A.K.

N82-19234# Committee on Science and Technology (U. S. House).
FUTURE SPACE PROGRAMS, 1981
Washington GPO 1981 335 p refs Hearing before the Subcomm. on Space Sci. and Appl. of the Comm. on Sci. and Technol., 97th Congr., 1st Sess., No. 50, 21-23 Sep. 1981
(GPO-86-913) Avail: Subcommittee on Space Science and Applications

Future space programs and the nature of the future in general are discussed. Predictions are made in the areas of science, technology, and demography. Space industrialization and space exploration are discussed. R.J.F.

N82-19235*# TRW Systems Group, Redondo Beach, Calif.
MATERIALS PROCESSING IN SPACE/SPACELAB. FES/VCGS PAYLOAD CRITICAL DESIGN REVIEW
25 Sep. 1980 173 p
Avail: NTIS HC A08/MF A01 CSCL 22A

A 25 mW He-Ne laser holographic recorder for recording the solution growth of triglycine sulfate crystals under low-zero gravity conditions is described. A systems engineering and design analysis, and mechanical and electrical design analyses of the equipmentation are presented. The equipment, fabricated for the SI-3 flight on the space shuttle, was designed to take 300 holograms (two orthogonal views) on 50-235 film of each growth experiment. Specifications and capabilities for support module mechanical assemblies are lso presented. M.D.K.

N82-19236*# Lockheed Missiles and Space Co., Huntsville, Ala.
MANUFACTURING IN SPACE: FLUID DYNAMICS NUMERICAL ANALYSIS Annual Report, Aug. 1980 - Aug. 1981
S. J. Robertson, L. A. Nicholson, and L. W. Spradley Aug. 1981 51 p refs
(Contract NASw-3281)
(NASA-CR-168610; LMSC-HREC-TR-D784480) Avail: NTIS HC A04/MF A01 CSCL 22A

Natural convection in a spherical container with cooling at the center was numerically simulated using the Lockheed-developed General Interpolants Method (GIM) numerical fluid dynamic computer program. The numerical analysis was simplified by assuming axisymmetric flow in the spherical container, with the symmetry axis being a sphere diagonal parallel to the gravity vector. This axisymmetric spherical geometry was intended as an idealization of the proposed Lal/Kroes growing experiments to be performed on board Spacelab. Results were obtained for a range of Rayleigh numbers from 25 to 10,000. For a temperature difference of 10 C from the cooling sting at the center to the container surface, and a gravitional loading of 0.000001 g a computed maximum fluid velocity of about 2.4 x 0.00001 cm/sec was reached after about 250 sec. The computed velocities were found to be approximately proportional to the Rayleigh number over the range of Rayleigh numbers investigated. Author

N82-19237*# Princeton Univ., N. J.
OAO-C COPERNICUS OPERATIONS REPORT Final Report
Sep. 1981 53 p
(Contract NAS5-23576)
(NASA-CR-166774) Avail: NTIS HC A04/MF A01 CSCL 22A

An analysis of the operation of OAO 3, Copernicus, the orbiting astronomical observatory, is given with particular emphasis upon the Princeton Experiment Package. Malfunctions and their impact are discussed, as are orbital observations and operations. Software is described. R.J.F.

N82-19238# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
ASTRONAUTICS: KEPLER AND HOHMANN [RAUMFAHRT: KEPLER UND HOHMANN]
H. O. Ruppe Mar. 1980 10 p In GERMAN
(TUM-RT-KB-80/1) Avail: NTIS HC A02/MF A01

The history of astronautics, its origins with Johannes Kepler, and Walter Hohmann's contribution are described. Hohmann based his theory of astronautics on Keplers laws of orbital mechanics. Kepler's law serves as the foundation for modern space mechanics and provides fast rough calculations for aeronautic measurements. The Hohmann trajectories serve as the obvious foundation of contemporary space technology, providing mathematical transparence and simplicity in the planning of space flights. E.A.K.

N82-19239# Northwick Park Hospital, Harrow (England). Clinical Research Centre.
SAFETY DEMONSTRATION STUDY ON PROPOSED BIORACK GLOVE BOX
H. S. Wolff, S. J. E. Humphrey, and J. Rashbass Paris ESA Mar. 1981 83 p Original contains color illustrations
(Contract ESA-4368/80/F-FC(SC))
(ESA-CR(P)-1482) Avail: NTIS HC A05/MF A01

A table top model of a glove box suitable for incorporation in the Spacelab biorack was tested. Containment tests following the internal dispersal of particles, microorganisms, and simulated spills of volatile materials were performed. The rate of removal of dispersed or volatilized substances from the working volume was investigated. The ergonomic aspects were considered. Results show that a simple design implemented with commercial components is capable of a very high degree of containment combined with a clean atmosphere in the working volume. Author (ESA)

N82-19240# Eurosat S.A., Geneva (Switzerland).
TELEOPERATION AND AUTOMATION: A SURVEY OF EUROPEAN EXPERTISE APPLICABLE TO DOCKING AND ASSEMBLY IN SPACE Final Report
Michel Plantier, Rene Bodmer, Jean Bernard Lagarde, and Charles Miller Paris ESA May 1981 80 p refs
(Contract ESTEC-4402/80/NL-AK(SC))
(MP/PR/4905; ESA-CR(P)-1487) Avail: NTIS HC A05/MF A01

Academic and industrial R and D bodies were surveyed in order to assess European robotic and teleoperator technology capabilities. Sensors and control mechanisms are considered. The

survey indicates that Europe could develop the facilities necessary for the automation of a large number of space stations. Computer hardware and software must be upgraded. More international cooperation is required to offset the advantages given to the U.S. and the USSR by their militarily subsidized research budgets. Author (ESA)

N82-19241# Fiat Research Center, Turin (Italy). Dept. of Technologies and Processes.

FOLLOW ON STUDY ON FLUID PHYSICS MODULE (PM). PART 1: INDEPENDENT OPERATING FLUID PHYSICS MODULE (FPM) Final Report

C. DAdda, G. Levizzari, R. Cerrato, and G. Rovera Paris ESA 1981 117 p

(Contract ESA-3631/78/F-FC(SC))

(Rept-79-RV-0; ESA-CR(P)-1509) Avail: NTIS HC A06/MF A01

An independently operating FPM, directly interfaced with the Spacelab subsystem, is proposed. An interface unit (IU) connects the FPM to the 28 V power supply bus and to the Spacelab command and data management subsystem. The power supply provides the voltages needed by the FPM and IU. The analog and digital signals acquisition starts every FPM cinecamera frame. The analog signals are converted to a digital format and stored in a buffer memory, together with digital signals and the time of the experiment. A microprocessor supervises the acquisition and updates the time elapsed, counting the 1024 KHz signal, distributed by the remote acquisition unit. The FPM signals are displayed for monitoring and initial setting of experiment parameters. A lamp display gives the status of the FPM during operation and acquisition phases, and provides alarm signals for anomalous conditions. Improvements which enlarge operational range and add monitoring capabilities are listed, e.g., fluid recovery, axial vibration and frame marking of film. Author (ESA)

N82-19242# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Product Assurance Dept. RQ11.

REPORT ON A STUDY OF THE MAINTENANCE IN READINESS OF ON-GROUND SPACECRAFT SYSTEMS FOR OPERATIONAL APPLICATION PROGRAMS

W. G. Cussen Paris ESA 24 Jun. 1981 46 p refs

(Contract ESA-4468/80/NL-AB)

(MBB-80-162/150; ESA-CR(P)-1513) Avail: NTIS HC A03/MF A01

Practical aspects of storage and maintenance of typical spacecraft equipment and program aspects relating to a decision to store such equipment were studied. Literature and experienced personnel were consulted. The long-term storage of operational equipment is expensive and should only be imposed on a project where there is a positively identified need. Where there is such a need it should be subject to a planned and coordinated approach recognized and directed at project management level from very early in the program. Onboard storage should be used as much as possible. Author (ESA)

N82-19243# European Space Agency, Paris (France). Directorate of Administration.

SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PARTS 1 AND 2: SURVEY OF SPACE PROGRAMS (1975 TO 1980); SURVEY OF THE CAPABILITIES AND EXPERIENCE OF THE EUROPEAN SPACE INDUSTRY

Giovanni Dondi Nov. 1981 290 p refs 3 Vol.

(ESA-SP-1012-Vol-1) Avail: NTIS HC A13/MF A01; ESA, Paris FF 80 (for volume 1) FF 300 (for complete set)

The programs and achievements of ESA since its creation, the evolution of ESA member national space programs, and international space programs involving European countries outside the ESA framework are reviewed. European industrial participation in space programs is summarized. Information on manufacturers involved in space industries is given for each member country, including their contributions to individual projects. Author (ESA)

N82-19244# European Space Agency, Paris (France). Directorate of Administration.

SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PART 3: DETAILED PRESENTATION OF THE EUROPEAN SPACE INDUSTRY (1981)

Giovanni Dondi Nov. 1981 535 p 3 Vol.

(ESA-SP-1012-Vol-2; ISSN-0379-6566) Avail: NTIS HC A23/MF A01; ESA, Paris FF 160 (for volume 2) FF 300 (for complete set)

The specializations, activities and potential of the space industry of ESA member countries are listed. The space firms of each country are indicated and their space activities are summarized. Contracts awarded by ESA to the firms of each country are detailed. Market guides for a number of key space/space related fields of activity, e.g., propulsion or remote sensing, are provided. Author (ESA)

N82-19245# European Space Agency, Paris (France). Directorate of Administration.

SPACE ACTIVITIES IN THE 80'S: THE PROGRAMS AND THE INDUSTRY. PART 4: OUTLOOK OF SPACE INDUSTRY OUTSIDE EUROPE (1981)

Giovanni Dondi Nov. 1981 260 p refs 3 Vol.

(ESA-SP-1012-Vol-3; ISSN-0379-6566) Avail: NTIS HC A12/MF A01; ESA, Paris FF 80 (for volume 3) FF 300 (for complete set)

The specializations, activities, and potential of each country are given for the American, Canadian, Japanese, and Indian space programs. Space firms in each country are indicated, and their space activities are summarized. Details of NASA contractors are provided for the U.S. Author (ESA)

N82-19246# European Space Agency, Paris (France). Science Advisory Committee.

RECOMMENDATIONS ON THE DEVELOPMENT OF SPACE SCIENCE IN THE 1980'S

Dec. 1981 74 p refs

(ESA-SP-1015; ESA-SPC(79)2; SAC(78)17) Avail: NTIS HC A04/MF A01

The role and effectiveness of ESA in science is reviewed and recommendations for development in the 1980's are made. These include: increasing the launch rate to one satellite per year; allocating Spacelab facilities to microgravity experiments as well as to atmospheric, plasma physics and astronomical investigations; and studying a fourth stage for Ariane or the use of alternative propulsion techniques. Author (ESA)

N82-20116*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

A SUMMARY OF SPACE FLIGHT MISSIONS SUPPORTED BY THE DEEP SPACE NETWORK

E. S. Burke *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 13-17 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 22A

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-19247 Royal Aircraft Establishment, Farnborough (England).

GEOPOTENTIAL HARMONICS OF ORDER 29, 30 AND 31 FROM ANALYSIS OF RESONANT ORBITS

D. G. King-Hele and Doreen M. C. Walker Aug. 1981 27 p refs

(RAE-TR-81109; RAE-Space-603; BR81087) Copyright. Avail: Issuing Activity

The Earth gravitational potential was investigated in order to evaluate lumped harmonics of a particular order m by analyses of resonant satellite orbits (orbits with tracks over the Earth that repeat after m revolutions). Results on 30th order harmonics from analyses of 15th-order resonance, and results on 29th and 31st order harmonics from 29:2 and 31:2 resonances are reviewed. The values available for 30th order lumped harmonics of even degree are numerous enough to allow a solution for individual coefficients of degree up to 40. The best determined coefficients are those of degree 30 For the 29th and 31st order harmonics, and for the 30th order harmonics of odd degree, there are not enough values to determine individual coefficients, but the lumped values from particular satellites can be used for

resonance testing of gravity field models, particularly the Goddard Earth Model (GEM) 10B (up to degree 36) and 10C (for degree > 36). The results of applying these tests are discussed. Author (ESA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N82-19248*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
FINANCIAL ASSESSMENT OF THE SPACE OPERATIONS CENTER AS A PRIVATE BUSINESS VENTURE Final Report
Michael Simon Jan. 1982 28 p refs Presented at Am. Astronautical Soc. Ann. Meeting, San Diego, Calif., 26-29 Oct. 1981 Submitted for publication
(Contract NASw-3204)
(NASA-CR-168636; Rept-39) Avail: NTIS HC A03/MF A01 CSCL 14B

The possibility of private financing and operation of the Space Operations Center (SOC) is considered as an alternative to SOC development by the government. A hypothetical revenue model for SOC services is constructed and is compared with NASA estimates of SOC development and operating costs. A present value analysis based on a 1985 to 2000 investment horizon shows a potential for substantial profit in a private SOC venture, although the possibility of large losses is not discounted. Present value estimates range from $8.6 billion down to a low minus $3.3 billion. Author

N82-19249*# Ford Aerospace and Communications Corp., Houston, Tex. Space Information Systems Operation.
MISSION SUPPORT PLAN STS-2
F. Ibanez 19 Aug. 1981 352 p
(Contract NAS9-15014)
(NASA-CR-167435; DRL-50) Avail: NTIS HC A16/MF A01 CSCL 22D

The plan defines the anticipated GSTDN/DOD station support and configuration requirements for a nominal flight with an orbital inclination of 38.4 degrees and a circular orbit of 120 nautical miles for the first 5 orbits and 137 nautical miles thereafter. A complete set of preliminary site configuration messages (SCM) define nominal station AOS/LOS times and configurations for S-Band and UHF support. This document is intended for use as a planning tool, providing the necessary guidelines and data base for SCM generation in support of STS-2. Author

N82-19250# Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.
A GLOSSARY OF RANGE TERMINOLOGY Final Report
1981 241 p
(AD-A108894; DG-502-81) Avail: NTIS HC A11/MF A01 CSCL 16/1

This glossary contains definitions, acronyms, occasional abbreviations and other information used in daily operations at the major test ranges and facilities. Some of the terminology is peculiar to certain activities, while other terms are common in usage and application. The basic issue of this glossary was a compilation of information from the other groups of the Range Commanders Council (RCC). This revision incorporates additional contributions, suggestions and recommendations submitted by these sources since publication of the basic issue. Major terms and subdivisions are listed alphabetically. Cross-references are used for clarification when necessary. GRA

N82-19251# Range Commanders Council, White Sands Missile Range, N. Mex. Documentation Group.
UNIVERSAL DOCUMENTATION SYSTEM HANDBOOK. SUPPLEMENT 2: PROCEDURES FOR THE ELECTRONIC TRANSMISSION AND PROCESSING OF LEVEL 1, 2, AND 3 TEST REQUIREMENTS AND SUPPORT INFORMATION Final Report
Oct. 1981 55 p
(AD-A108901; DG-501-79-Suppl-2) Avail: NTIS HC A04/MF A01 CSCL 17/2

This supplement describes the procedures for converting the Universal Documentation System (UDS) forms to a format more conducive to electronic transmission. The purpose of these procedures is to provide a standard format for electronic processing and transmission of the UDS forms which will be compatible with typewriters, optical character recognition readers, word processors, and high-speed computer printers. GRA

N82-19252# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MILLSTONE HILL RADAR SATELLITE TRACKING SYSTEM
Eli M. Hauser 4 Nov. 1981 65 p
(Contract F19628-80-C-0002; AF Proj. 2296; AF Proj. 2750)
(AD-A109279; STK-114; ESD-TR-81-298) Avail: NTIS HC A04/MF A01 CSCL 22/4

This document describes the hardware utilized at the Lincoln Laboratory Millstone radar facility. A system overview is presented which explains the function each subsystem fulfills and its interaction with the system. A detailed analysis of each subsystem follows. Diagrams for each level of consideration are included. This document is current as of 1 September 1981. Author (GRA)

N82-20117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HELIOS MISSION SUPPORT
A. L. Berman, C. T. Stelzried, B. L. Seidel, J. C. Nash, and R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 18-23 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22D

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-19253 Alabama Univ. in Huntsville.
TARGET/CLUTTER DISCRIMINATION TECHNIQUES FOR LASER SEMI-ACTIVE MISSILE SYSTEMS Ph.D. Thesis
Huey Frederick Anderson 1981 193 p
Avail: Univ. Microfilms Order No. 8128319

Laser semi-active missile systems, a class of precision guided weapons, are utilized in terminal homing applications. However, clutter signals due to atmospheric and battlefield aerosol backscatter degrade detection performance. Differences between target and clutter signals are determined through field measurements and computer simulations. On this basis two new discrimination and detection techniques are developed and evaluated. The first technique combines FFT processing, inverse filtering and adaptive detection. In the second technique, digital filtering is performed in the time domain and results are evaluated in the frequency domain. The techniques have been applied to realistic target and clutter signals resulting in improvement up to 10db in signal-to-clutter ratios. Adaptive detection when combined with inverse filtering provides correct decisions for all target and clutter signals processed. Dissert. Abstr.

N82-19254 Royal Aircraft Establishment, Farnborough (England).
TABLE OF SPACE VEHICLES, 1958 - 1980
H. Hiller and J. A. Pilkington Jul. 1981 52 p refs
(RAE-TR-81095; RAE-Space-602; BR81084) Copyright. Avail: Issuing Activity

Details of all space vehicles that escaped from the Earth's influence as a result of the 109 launchings from 1958 to 1980 are given. Name, international designation, launch date, mass, basic shape and size, details of orbit or trajectory, and the time and place of impact or landing on the Moon or a planet are indicated. The table includes orbits around the Sun, in the

Earth-Moon system, and around the Moon, around Mars, and around Venus. Author (ESA)

N82-19255*# Wiggins (J. H.) Co., Redondo Beach, Calif.
DEVELOPMENT OF STS/CENTAUR FAILURE PROBABILITIES LIFTOFF TO CENTAUR SEPARATION Final Report
James M. Hudson Feb. 1982 82 p
(Contract NAS9-16259)
(NASA-CR-167549; TR-82-1404) Avail: NTIS HC A05/MF A01 CSCL 22B

The results of an analysis to determine STS/Centaur catastrophic vehicle response probabilities for the phases of vehicle flight from STS liftoff to Centaur separation from the Orbiter are presented. The analysis considers only category one component failure modes as contributors to the vehicle response mode probabilities. The relevant component failure modes are grouped into one of fourteen categories of potential vehicle behavior. By assigning failure rates to each component, for each of its failure modes, the STS/Centaur vehicle response probabilities in each phase of flight can be calculated. The results of this study will be used in a DOE analysis to ascertain the hazard from carrying a nuclear payload on the STS. Author

N82-19256# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GENERAL CONFIGURATION AND INTERNAL DISPOSITION OF EQUIPMENT IN A SATELLITE FOR COLLECTING ENVIRONMENTAL DATA
Carlos deOliveira Lino and Aydano Barreto Carleial Oct. 1981 32 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 81-5 Jul. 1981
(INPE-2240-PRE/026) Avail: NTIS HC A03/MF A01

The general configuration of an experimental satellite for reception and retransmission to the Earth of environmental data is described. The data originates from small automatic Earth stations equipped with sensors and capable of operating in remote locations. The interrelationships among the equipment blocks constituting the satellite and between these and the outside medium, which were used in the search for an adequate disposition for the equipment blocks are presented. The proposed internal and external disposition for the blocks is presented in drawings. Some mechanical quantities (position of the center of mass, moments of inertia) resulting from the mass distribution inherent to the chosen configuration, are calculated. S.L.

N82-19257*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE SYSTEMS TECHNOLOGY, PART 2, 1981
William J. Boyer, comp. Mar. 1982 479 p refs Conf. held in Hampton, Va., 16-19 Nov. 1981
(NASA-CP-2215-Pt-2; L-15096-Pt-2) Avail: NTIS HC A21/MF A01 CSCL 22B

Four major areas of interest are covered: technology pertinent to large antenna systems; technology related to the control of large space systems; basic technology concerning structures, materials, and analyses; and flight technology experiments. Large antenna systems and flight technology experiments are described. Design studies, structural testing results, and theoretical applications are presented with accompanying validation data. These research studies represent state-of-the art technology that is necessary for the development of large space systems. A total systems approach including structures, analyses, controls, and antennas is presented as a cohesive, programmatic plan for large space systems. For individual titles, see N82-19258 through N82-19285.

N82-19258*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
JPL ANTENNA TECHNOLOGY DEVELOPMENT
R. E. Freeland *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 429-438 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Systems-level technology for evolving cost-effective, STS compatible antennas that will be automatically deployed in orbit to perform a variety of missions in the 1985 to 2000 time period is discussed. For large space-based antenna systems, the LSST program has selected deployable antennas for development. The maturity of this class of antenna, demonstrated by the success of smaller size apertures, provides a potential capability for satisfying a significant number of near-term, space-based applications. The offset wrap-rib concept development is the basis of the JPL LSST antenna technology development program. Supporting technology to the antenna concept development include analytical performance prediction, the capability for measuring and evaluating mechanical antenna performance in the intended service environment, and the development of candidate system-level configurations for potential applications utilizing the offset wrap-rib antenna concept. Author

N82-19259*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
OFFSET WRAP RIB ANTENNA CONCEPT DEVELOPMENT
A. A. Woods, Jr. and N. F. Garcia *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 439-470 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The demonstration of 50 to 150 m, STS compatible, offset antenna technology readiness is reported. Fabrication of a ground and flight testable partial 55 m reflector section and feed support structure is discussed. Reduction to practice through ground test verification is presently contained in the program. Key objectives for the program include the design of a compatible feed support structure and the fabrication and testing of critical components. T.M.

N82-19260*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANALYTICAL PERFORMANCE PREDICTION FOR LARGE ANTENNAS
M. El-Raheb *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 471-478 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The coupled free-free modes of the 55M LMSS antenna configuration are shown. They were determined using modal synthesis. Reflector modes clamped at the hub were calculated adopting the efficient cyclic symmetry technique. Similarly, clamped hub modes of the offset boom structure were calculated. The modes of the two substructures were then combined through the process of modal synthesis on the assumption that the interface at the hub structure is rigid thus satisfying statically determinate matching conditions. For attitude control purposes, only modes associated with symmetric components zero and one involve net motions of the center of gravity of the reflector. This condition restricts the set of admissible eigenfunctions for modal synthesis. Modes with symmetric components higher than one are excited only by forces acting on the ribs. These modes are totally uncoupled from the boom dynamics. T.M.

N82-19261*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURFACE MEASUREMENT SYSTEM DEVELOPMENT
Martin Berdahl *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 479-490 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The development of an optical system designed to satisfy the requirements of early deployable concepts such as the LMSC offset wrap rib antenna is reported. The system is relatively lightweight, will measure distance to several targets, and provide data in engineering units in real time. Accuracy of measurements is such that use of the system will permit evaluation of surface quality of large parabolic antenna dishes. Operation of the system was conceptually proven. T.M.

N82-19262*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SUMMARY OF ANTENNA TECHNOLOGY DEVELOPMENT AT THE LANGLEY RESEARCH CENTER
Thomas G. Campbell *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 491-502 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Compatible antenna systems for the STS are discussed. Potential applications of the systems include communications,

radiometry, and radio astronomy. The technologies discussed are those needed to evaluate, fabricate, package, design, transport, and cost effectively deploy the antenna systems. T.M.

N82-19263*# Harris Corp., Melbourne, Fla.
MAYPOLE (HOOP/COLUMN) CONCEPT DEVELOPMENT PROGRAM
M. R. Sullivan *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 503-550 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The program is divided into six tasks: preliminary design and performance; materials development; advanced concepts; economic assessment; demonstration/verification models; and a 15 meter engineering model. All support the main objective of the program which is the technology development necessary to evaluate, design, manufacture, package, transport and deploy the Hoop/Column reflector by means of a ground-based test program. Progress for each task is reported. T.M.

N82-19264*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIO FREQUENCY VERIFICATION TASKS RELATED TO A MULTIPLE APERTURE REFLECTOR SYSTEM
Thomas G. Campbell *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 551-556 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The establishment of analytical methods for predicting the electromagnetic performance of multiple offset fed apertures for multiple beam large space antenna systems is highlighted. The development of experimental modeling techniques for verifying the analytical methods used in predicting the effects of surface roughness (pillows), scattering, and aperture coupling on RF performance is discussed. T.M.

N82-19265*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY EXPERIMENTAL TEST RESULTS USING 35 GHz OFFSET FED REFLECTOR SIMULATING SURFACE PILLOWS AND APERTURE CABLES
Thomas G. Campbell and W. Robert Young *In its* Large Space Systms Technol., Pt. 2, 1981 Mar. 1982 p 557-582 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The effects caused by reflector surface pillows and aperture cables on RF performance were determined. The test uses models that were designed to be replicas of a quad aperture at the proper F/D = 1.50 as provided in the LSST point design. Separate pillow models were machined from solid aluminum sections that simulated the surface contour pillows but on an exaggerated basis. The worse case pillow heights lamda/20 and lamda/5 were machined onto the precision reflector. In addition to the pillow effects, the scattering effects of aperture (Hoop/Column cables) cables were determined. Therefore, simulated quartz and graphite cables were tested with the smooth, lamda/20, and lamda/5 reflector models. T.M.

N82-19266*# Martin Marietta Corp., Denver, Colo.
PRELIMINARY ANALYTICAL RESULTS USING SURFACE CURRENT INTEGRATION FOR PREDICTING EFFECTS OF SURFACE PILLOWS ON RF PERFORMANCE
C. E. Farrell and D. A. Strange *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 583-590 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

An overview of the fast integral RF evaluation (FIRE) program is presented. This program uses surface current integration to evaluate RF performance of antenna systems. It requires modeling of surfaces in X, Y, Z coordinates along equally spaced X and Y grids with Z in the focal directon. The far field contribution of each surface point includes the effects of the Z-component of surface current which is not included in the aperture integration technique. Because of this, surface current integration is the most effective and inclusive technique for predicting RF performance on non-ideal reflectors. Results obtained from use of the FIRE program and an aperture integration program to predictt RF performance of a LSS antenna concept are presented. T.M.

N82-19267*# Harris Corp., Melbourne, Fla.
RF VERIFICATION TASKS UNDERWAY AT THE HARRIS CORPORATION FOR MULTIPLE APERTURE REFLECTOR SYSTEM
T. A. Gutwein *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 591-604 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Mesh effects on gain and patterns and adjacent aperture coupling effects for 'pie' and circular apertures are discussed. Wire effects for Harris model with Langley scale model results included for assessing D/lamda effects, and wire effects with adjacent aperture coupling were determined. Reflector surface distortion effects (pillows and manufacturing roughness) were studied. T.M.

N82-19268*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DISTORTED REFLECTOR ANTENNA PERFORMANCE PREDICTION TECHNIQUE
M. C. Bailey *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 605-610 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The application of a 3-D curve-fit technique to the electromagnetic analysis of reflector antennas is presented. the reflector antennas are described by the coordinates of an irregular distribution of measured points on the reflector surface. The reflector antenna analysis method used to calculate radiation patterns is geometric-optics with aperture-integration since an efficient and accurate computer code was readily available for modification. T.M.

N82-19269*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENT OF LOSSES OF MESH MEMBRANE MATERIAL FOR REFLECTOR APPLICATIONS WITH AN S-BAND RADIOMETER
Hans-Juergen C. Blume *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 611-620 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The spatial resolution, the frequency of revisits, and the accuracy requirements for the detection of Earth surface parameters from space force the satellite designers to consider large space structures for microwaves. Some Earth surface parameters are only detectable with radiometers. Because the large reflectors should be much lighter than solid and deployable reflectors, mesh membrane material is considered to be used as the reflector. It is essential to determine the emissivity of the reflecting material even when close to zero to estimate the accuracy of the radiometer measurement. An existing S-band radiometer was used to determine the loss of a 1 sq m pretensioned mesh first in a field experiment and later in a well shielded laboratory set-up. The models for retrieving the emissivity of the mesh are described in detail and the equivalent losses for different mesh positions were calculated. T.M.

N82-19270*# Harris Corp., Melbourne, Fla.
THE SUITABILITY OF MESH MEMBRANE MATERIAL FOR RADIOMETER REFLECTOR APPLICATIONS
W. F. Croswell *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 621-630 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The standard measurement system used for evaluating the transmission properties of mesh used in deployable antennas is shown schematically. The system allows the rapid measurement of the transmissivity of mesh samples at a given incidence angle. The analysis has the advantage in that the effects of conductivity loss,' junction impedance, and cross polarization can be treated. T.M.

N82-19271*# TRW Defense and Space Systems Group, Redondo Beach, Calif.
CONCEPTED DESIGN OF A SURFACE MEASUREMENT SYSTEM FOR LARGE DEPLOYABLE SPACE ANTENNAS
R. S. Neiswander *In* NASA. Langley Research Center Large

Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 631-640 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The sensor system is in essence a point design, specifically interfacing with the Harris, Inc., 1000 meter deployable mesh communication antenna. The design can, without large modification, be adapted to other large deployable antennas such as the Lockheed Wrap-rib, the General Dynamics Precision Erectable Truss and the TRW Advanced Sunflower antennas. Measurements are optical displacements. The elements of the system are a central cluster of receivers near the apex of the antenna and active bright targets at the antenna. The cluster defines a single coordinate frame from which all surface positions are referenced. The receivers continuously observe an extended array of sample points located throughout the reflecting surface and its supporting structure. For the Harris antenna, the surface samples are at the mesh gore lines and at the supporting hoop. Output data is in real-time, compatible with on-board processing and active control of antenna figure. Lifetime of the system is at least 10 years continuous operation in space. T.M.

N82-19272*# Barnes Engineering Co., Stamford, Conn.
ELECTRO-OPTICAL SYSTEM FOR REMOTE POSITION MEASUREMENTS IN REAL TIME
P. W. Collyer, S. C. Spielberger, and K. A. Ward *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 641-656 refs (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The development of an electro-optic position sensing system usable for Large Space Systems applications is described. A form of autocollimation was selected as the best overall technology, and a brassboard model was fabricated and tested. L.F.M.

N82-19273*# Martin Marietta Aerospace, Denver, Colo.
NEAR FIELD TESTING OF LARC MULTIPLE BEAM ANTENNA
G. J. Lang *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 657-680 refs (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Near field antenna measurements as an alternative to far field measurements are discussed. Most of the serious shortcomings of far field measurements can be alleviated using near field techniques. The near field data can be used as a direct diagnostic of antenna performance before the integration by the aperture which can make it difficult to isolate the cause of far field pattern anomalies. L.F.M.

N82-19274*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ELECTROSTATIC MEMBRANE ANTENNA CONCEPT TESTING Progress Report
J. W. Goslee *In its* Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 681-688 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The electrostatic concept is evaluated to determine its feasibility for future antenna applications. The concept tested illustrates how the individual power supplies are connected to concentric electrodes located in back of the plastic membrane which is the reflective surface. L.F.M.

N82-19275*# Martin Marietta Aerospace, Denver, Colo.
CONCEPTUAL DESIGN OF ELECTROSTATIC ANTENNA
J. V. Coyner *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 689-707 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The concept of using electrostatic forces to tension a thin, conducting membrane and maintain it in a precision antenna shape is discussed. This electrostatically controlled membrane mirror is an adpative structure which maintains surface quality despite errors in construction, irrregularities of materials, solar heating, and on board disturbances. L.F.M.

N82-19276*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANTENNA SUBSYSTEM REQUIREMENTS
R. E. Freeland *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 707-710 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

An in depth review of the hoop/column and offset wrap rib antenna technology development program was conducted. Additional work that needs to be undertaken to bring concept developments to a system level technology readiness state was identified. L.F.M.

N82-19277*# Boeing Aerospace Co., Seattle, Wash.
CONFIGURATION DEVELOPMENT OF THE LAND MOBILE SATELLITE SYSTEM (LMSS) SPACECRAFT
C. T. Golden, J. A. Lackey, and E. E. Spear *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 711-760 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

Configurations for a Land Mobile Satellite System Spacecraft are discussed. It is a preliminary concept of a quad aperture reflector spacecraft capable of relaying radio messages to land mobile units throughout the United States. L.F.M.

N82-19278*# Boeing Aerospace Co., Seattle, Wash.
CONFIGURATION DEVELOPMENT OF THE LAND MOBILE SATELLITE SYSTEM (LMSS) SPACECRAFT: CONCLUSIONS
C. T. Golden, J. A. Lackey, and E. E. Spear *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 761-766 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

It is concluded that both the wrap/rib and hoop/column antenna designs are feasible for the Land Mobile Satellite System. Additional configuration design iterations are necessary. L.F.M.

N82-19279*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LAND MOBILE SATELLITE SYSTEMS (LMSS): SINGLE APERTURE SYSTEM DESIGN
W. J. Weber, III *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 797-780 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22B

The large size of the UHF antenna on the satellite provides two advantages with respect to the Land Mobile Satellite System design. It provides tremendous gain for both transmitting and receiving at the satellite and enables very simple, low power equipment in the mobile vehicle. The UHF antenna for this study was selected to have an aperture of 55 meters. This implies a beamwidth of roughly 0.45 degree and requires 87 beams to cover the continental United States. L.F.M.

N82-19280*# General Electric Co., Philadelphia, Pa. Space System Div.
QUAD APERTURE RF DEFINITION
P. Foldes *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 781-820 (For primary document see N82-19257 10-15)
Avail: NTIS HC A21/MF A01 CSCL 22A

A single STS package 118 m diameter hoop/column antenna is capable of providing service for appr. 250,000 mobile users. The selected quad aperture configuration is able to provide at least 25 db C/I without cable blockage, column scatter, coupling between quad apertures, and tolerance effects. A feed can be designed which uses single polarized radiating elements while the overall system employs dual polarization. The quad aperture concept can eliminate the use of diplexers and their associated losses. The critical technology issues in the RF area include the design of the radiating elements, BFN, monolithic power amplifiers and receiver front end, tolerance control and packaging of the feed. L.F.M.

N82-19281*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

ATTITUDE CONTROL SUBSYSTEM STUDY FOR THE LAND MOBILE SATELLITE SYSTEM SPACECRAFT

A. F. Tolivar *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 821-839 (For primary document see N82-19257 10-15)

Avail: NTIS HC A21/MF A01 CSCL 22B

This Attitude Control Subsystem study applies the generic antenna control technology to the specific requirements of the Land Mobile Satellite System mission and defines suitable attitude control subsystem designs for both the wrap/rib and hoop/column antenna configurations. The technology developments required to establish technology readiness by 1987 are also identified. L.F.M.

N82-19282*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

STRUCTURAL ASSEMBLY DEMONSTRATION EXPERIMENT

Jack W. Stokes *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 841-858 refs (For primary document see N82-19257 10-15)

Avail: NTIS HC A21/MF A01 CSCL 22B

The experiment is of an operational variety, designed to assess crew capability in Large Space System (LSS) assembly. The six Structural Assembly Demonstration Experiment objectives include: (1) the establishment of a quantitative correlation between LSS neutral buoyancy simulation and on-orbit assembly operations in order to enhance the validity of those assembly simulations; (2) the quantitative study of the capabilities and mechanics of human assembly in an Extravehicular Activity environment; (3) the further corroboration of the LSS Assembly Analysis cost algorithm through the obtainment of hard data base information; (4) the verification of LSS assembly techniques and timeless, as well as the identification of crew imposed loads and assembly aid requirements and concepts; (5) verification of a Launch/Assembly Platform structure concept for other LSS missions; and (6) lastly, to advance thermal control concepts through a flexible heat pipe. L.F.M.

N82-19283*# Massachusetts Inst. of Tech., Cambridge.

STRUCTURAL ASSEMBLY DEMONSTRATION EXPERIMENT (SADE) EXPERIMENT DESIGN

D. L. Akin and M. L. Bowden *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 859-880 (For primary document see N82-19257 10-15)

Avail: NTIS HC A21/MF A01 CSCL 22B

The Structural Assembly Demonstration Experiment concept is to erect a hybrid deployed/assembled structure as an early space experiment in large space structures technology. The basic objectives can be broken down into three generic areas: (1) by performing assembly tasks both in space and in neutral buoyancy simulation, a mathematical basis will be found for the validity conditions of neutral buoyancy, thus enhancing the utility of water as a medium for simulation of weightlessness; (2) a data base will be established describing the capabilities and limitations of EVA crewmembers, including effects of such things as hardware size and crew restraints; and (3) experience of the M.I.T. Space Systems Lab in neutral buoyancy simulation of large space structures assembly indicates that the assembly procedure may create the largest loads that a structure will experience during its lifetime. Data obtained from the experiment will help establish an accurate loading model to aid designers of future space structures. L.F.M.

N82-19284*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

SOLAR ARRAY FLIGHT EXPERIMENT (SAFE)

R. W. Schock *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 881-891 (For primary document see N82-19257 10-15)

Avail: NTIS HC A21/MF A01 CSCL 22B

The solar arrays flight experiment consists of four experiments on two different flights. The first experiment, termed the baseline, has a basic purpose to demonstrate the flight readiness of lightweight solar array technology for solar electric propulsion and other payload power applications. The early availability of this experiment and its basic large space structure characteristics make it a logical candidate to demonstrate other disciplines critical to large space structures. These demonstrations form the basis for three other solar array experiments, two in remote sensing and one in control. All of these experiments are briefly reviewed in this paper. L.F.M.

N82-19285*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LARGE SPACE SHUTTLE FLIGHT EXPERIMENT

Lyle M. Jenkins *In* NASA. Langley Research Center Large Space Systems Technol., Pt. 2, 1981 Mar. 1982 p 893-909 (For primary document see N82-19257 10-15)

Avail: NTIS HC A21/MF A01 CSCL 22B

It appears practical to challenge the Orbiter DAP with a large, attached structure. The definition of this capability is a fundamental step in the development of nearly all large space systems currently under consideration. Experiment features may be incorporated that apply to control systems for large space systems such as modal damping devices. In a relatively simple deployable structure, the correlation of flight test results with ground test and analysis should provide a basis for extrapolation to more complex structures. Initial experiment concepts will provide a starting point for the examination of antenna feed mast requirements with the objective changing the design to produce a representative test article. Correlation of construction operations with ground simulations will provide for better task and time-line definition. EVA needs to be a direct benefit to the conduct of the experiment. Early consideration of safety issues is a precaution against defining an unacceptable experiment concept. Integration of many objectives seems feasible and is generally perceived as the only way to justify a relatively expensive experiment. L.F.M.

N82-19286# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THERMOELASTIC DEFORMATION IN CYLINDRICAL SHELLS OF GREAT LENGTH [DEFORMACAO TERMOELASTICA EM CASCAS CILINDRICAS DE GRANDE ALONGAMENTO]

Wolodymir Boruszewski Nov. 1981 14 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 Nov. 1981

(INPE-2268-PRE/049) Avail: NTIS HC A02/MF A01

The utilization of long and slender cylindrical shells, as flexible appendages of satellites, is presented intending to introduce the problem of bending and torsion of thermoelastic origin. A finite element method approach to this problem is proposed. S.L.

N82-19287# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

RETROSPECTIVE ANALYSIS OF SATELLITE THERMAL SYSTEMS M.S. Thesis [ANALISE RETROSPECTIVA DE SISTEMS TERMICOS PARA SATELITE]

Kiyoshi Yoneda Dec. 1981 75 p refs In PORTUGUESE; ENGLISH summary

(INPE-2295-TDL/069) Avail: NTIS HC A04/MF A01

The backward analysis of heat transfer in a satellite is studied. Given heat quantities generated by the Sun and the equipment, and given the component temperatures, the heat transfer coefficients for conduction and radiation are investigated. The mathematical formulation results in an ill conditioned noisy system of linear equations. Two methods for solving the system are discussed: the variable selection and the singular value decomposition methods. The use of the nonnegativity conditions for the heat transfer coefficients are discussed and more general solutions are presented. S.L.

N82-19288*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

OAO-3 END OF MISSION TESTS REPORT

Ford Kalil, F. Jerry Kull, R. McIntosh, S. Ollendorf, Donald L. Margolies, Jim Gemmell, C. Michael Tasevoli, R. S. Polidan, H. Kochevar, Cooper Chapman et al Sep. 1981 170 p refs Prepared in cooperation with Princeton University Observatory and Westinghouse Electric Corp., Pittsburgh

(NASA-TM-83824) Avail: NTIS HC A08/MF A01 CSCL 22A

Twelve engineering type tests were performed on several

subsystems and experiment(s) of the OAO 3 spacecraft near its end of mission. The systems tested include: Princeton experiment package (PEP), fine error system guidance, inertial reference unit, star trackers, heat pipes, thermal control coatings, command and data handling, solar array; batteries, and onboard processor/power boost regulator. Generally, the systems performed well for the 8 1/2 years life of OAO 3, although some degradation was noted in the sensitivity of PEP and in the absorptivity of the skin coatings. Battery life was prolonged during the life of the mission in large part by carefully monitoring the charge-discharge cycle with careful attention not to overcharge. S.L.

N82-19289# Naval Research Lab., Washington, D. C.
RANGING AND SYCHRONIZATION BETWEEN NOMINALLY CO-ORBITAL SATELLITES Interim Report
J. W. Schwartz 24 Dec. 1981 16 p refs
(AD-A109272; NRL-8532) Avail: NTIS HC A02/MF A01 CSCL 22/3

A link between two satellites can provide direct measurements of clock synchronism and intersatellite range that are more accurate than estimates obtainable from ground measurements. Moreover these direct measurements can be made continuously with near-zero delays. Two approaches to ranging and synchronization between satellite pairs are 'balanced' systems in which each satellite makes a time-difference measurement, and 'full loop' systems in which a time-difference measurement is made on only one satellite. This report discusses factors which determine the ultimate limitations and capabilities of both approaches, and compares the schemes for applications in which two digital clocks are actually brought into synchronism with accuracies of several nanoseconds. Author (GRA)

N82-19290# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
AERODYNAMIC DESIGN MANUAL FOR TACTICAL WEAPONS Final Report
Lawrence A. Mason, Leroy Devan, Frank G. Moore, and Donald McMillan Jul. 1981 178 p refs
(DA Proj. 1L1-62303-A-214)
(AD-A109180; NSWC/TR-81-156) Avail: NTIS HC A09/MF A01 CSCL 20/4

The Naval Surface Weapons Center Aeroprediction Code has been extensively applied to the prediction of static and dynamic aerodynamics of missile configurations. Major extensions have recently been made to the Code, extending its capability to 0 less than or equal to M (infinity) less than or equal to 8 and 0 degrees less than or equal to alpha less than or equal to 180 degrees and improving the transonic and dynamic derivative predictions. The theoretical basis for the Code is reviewed. The Code is evaluated through comparisons of computational examples with experiment for body alone, body-tail, and body-tail-canard configurations. The speed and accuracy of the Code is ideal for use in preliminary design. Representative design charts (generated by the use of the Code) for both the static and dynamic aerodynamic coefficients of a wide variety of configuration components are included. The charts will aid the designer in making preliminary design estimates or for data comparisons. GRA

N82-19291# ARO, Inc., Arnold Air Force Station, Tenn.
HYPERVELOCITY TRACK TESTS OF THE NASA GALILEO PROBE HEATSHIELD Final Report, 14 Oct. - 24 Nov. 1980
A. M. Adams AEDC Dec. 1980 19 p refs
(AD-A109042; AEDC-TSR-80-V60) Avail: NTIS HC A02/MF A01 CSCL 22/2

Tests were conducted in a hypervelocity track facility to establish the ablative characteristics of the heatshield material for the NASA/Ames Galileo Probe. Data were obtained from eight shots at launch velocities ranging from 15,850 fps to 17,950 fps. Six of the shots were conducted through an argon environment. The test required the nosetip to be recovered intact. Measurements were made of the model velocity and in-flight surface temperature. A description of the test unit, test article, and test technique is presented herein. Author (GRA)

N82-19292# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 1: EXECUTIVE SUMMARY Final Report
Paris ESA Nov. 1979 73 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-1; ESA-CR(P)-1481-Vol-1) Avail: NTIS HC A05/MF A01

The study objectives, mission analysis, EXUV system and subsystem guidelines, and development program are summarized. The mission requires an extreme UV telescope whose nominal waveband is from 100 to 912 A, and a soft X-ray telescope in the 5 to 250 A waveband. The EXUV source examination needs spatial resolution and source position accuracy of arcmin order. The observation program is divided into a 6 month slow scan survey of the entire celestial sphere, 6 months complementary survey work, and a 12 month study of specific EXUV sources. A longitudinal satellite configuration with three axis stabilized attitude control is adopted. Thermal control, electrical power subsystems, data handling, and communications subsystems are described. Author (ESA)

N82-19293# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 2A: SATELLITE SYSTEM CONCEPTUAL DESIGN Final Report
Paris ESA Nov. 1979 282 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-2A; ESA-CR(P)-1481-Vol-2A) Avail: NTIS HC A13/MF A01

A longitudinal configuration comprising a service module and two telescope assemblies (X-ray, UV) was adopted for the EXUV satellite. The telescopes are parallel to launcher (Ariane) longitudinal axis. The advantages of longitudinal configuration over transverse are: less demanding dynamic balance requirements; payload growth potential; no solar scattering hazard from service module; and less sensitivity of payload contamination from thrusters. The satellite is three axis spin stabilized. The service module is a parallelipipedic box with two equipment floors supported by a central cylinder. The payload is on top of the service module. Each telescope is cantilevered at the focal plane assembly interface, using a statically determinate mounting system consisting of three sliding trunnions with spherical bearings. Author (ESA)

N82-19294# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 2B: SATELLITE SYSTEM CONCEPTUAL DESIGN Final Report
Paris ESA Nov. 1979 369 p refs Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-2B; ESA-CR(P)-1481-Vol-2B) Avail: NTIS HC A16/MF A01

The EXUV satellite power storage/conditioning system, communication subsystem, data handling subsystem and attitude determination/control subsystem are described. During the launch and acquisition phases batteries supply all power required until the solar array is oriented towards the Sun. During the second year of operation the payload must be switched off for battery recharging. The telemetry system transmits 14 Kbits/sec scientific data to ground stations and 2 Kbit/sec housekeeping data. A 750 bit/sec telecommand rate ensures a 33 s sky map reloading. About 0.25 sec is required for two on/off commands. The onboard data processing system which is under ground control handles satellite orientation, payload activites, satellite housekeeping and scientific data transmission. Three axis stabilization is achieved by continuous x axis pointing towards the Sun with a simultaneous roll motion at nearly constant rate. Author (ESA)

N82-19295# Engins Matra, Velizy (France).
EXUV. PHASE A REPORT. VOLUME 3: PRELIMINARY PAYLOAD INTERFACE SPECIFICATION Final Report
Paris ESA Nov. 1979 66 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol.
(Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-3; ESA-CR(P)-1481-Vol-3) Avail:

NTIS HC A04/MF A01

The optical, mechanical, thermal, command/data interfaces of the EXUV X-ray and UV telescopes are defined, along with mass properties, ground handling, cleanliness, power requirements and budget. The telescopes are mounted on a support which also accommodates two star trackers forming part of the satellite attitude control system. Tracker/telescope interface is treated since maintenance of alignment between them is crucial to mission success. Advantages resulting from commonality between the telescopes include ease and cost of manufacture, development and testing. Accommodation and integration of the payload are facilitated. Author (ESA)

N82-19296# Engins Matra, Velizy (France).
EXUV. PHASE A STUDY. VOLUME 4: SATELLITE DEVELOPMENT PROGRAM Final Report
Paris ESA Nov. 1979 51 p Prepared in cooperation with British Aerospace Dynamics Group, Bristol, England and Dornier-Werke G.m.b.H., Friedrichshafen, West Germany 5 Vol. (Contract ESTEC-3846/79/NL-MS)
(Rept-44/69/JS/CB-Vol-4; ESA-CR(P)-1481-Vol-4) Avail: NTIS HC A04/MF A01

Model utilization in the EXUV satellite development program is discussed and a master time schedule is outlined. Assembly, integration, test and launch plan are described. Ground support equipment specifications are given. A combination prototype/flight model offers large cost savings, as does a structural/thermal model. The master schedule comprises a 12 month project definition phase and a 36 month development/protoflight phase. Integration and test sequences include launch operations, structure/thermal model tests, engineering model tests, and prototype/flight model tests. Ground support equipment consists, where possible, of concepts, designs and test equipment from previous ESA programs. Author (ESA)

N82-19297# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Abteilung Forschungsanlagen.
ON THE DESIGN OF MISSILE MODELS FOR STATIC FORCE MEASUREMENTS IN WIND TUNNELS
Helmut Esch Aug. 1981 88 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-81-21) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 15,65

A computer program was developed to aid in the design of missile models, stings and balances for wind tunnel tests at high angle of attack. The high normal forces encountered in such tests, especially for slender missile configurations, can lead to overload of the balance or to contact between model and sting. Design optimization will help to increase the angle of attack range. Model dimensioning, force fields, and stress analysis in balance and sting are described and an optimization of geometrical parameter with respect to stress and balance exploitation is performed. The results show that improvements can be obtained by optimization of the sting length, usage of sting materials with high elasticity modulus, conical shaping of the balance sting, and by optimization of the ratio of sting diameter to model bore. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

N82-19298* National Aeronautics and Space Administration, Washington, D. C.
COLUMBIA CARRIES ASTRONOMY EXPERIMENTS ON THIRD TEST FLIGHT
Mar. 1982 99 p
(NASA-News-Release-82-29; P82-10029) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

The Space Transportation System 3 flight is discussed. The objectives of the test flight are given as well as an account of launch preparations, in liftoff, reentry; and landing. Numerous astronomy and space science experiments carried in the cargo bay are described. R.J.F.

N82-19299*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PROPULSION SYSTEM IGNITION OVERPRESSURE FOR THE SPACE SHUTTLE
R. S. Ryan, J. H. Jones, S. H. Guest, H. G. Struck, M. H. Rheinfurth, and V. S. Verferaime Dec. 1981 70 p refs
(NASA-TM-82458) Avail: NTIS HC A04/MF A01 CSCL 20H

Liquid and solid rocket motor propulsion systems create an overpressure wave during ignition, caused by the accelerating gas particles pushing against or displacing the air contained in the launch pad or launch facility and by the afterburning of the fuel-rich gases. This wave behaves as a blast or shock wave characterized by a positive triangular-shaped first pulse and a negative half-sine wave second pulse. The pulse travels up the space vehicle and has the potential of either overloading individual elements or exciting overall vehicle dynamics. The latter effect results from the phasing difference of the wave from one side of the vehicle to the other. This overpressure phasing, or delta P environment, because of its frequency content as well as amplitude, becomes a design driver for certain panels (e.g., thermal shields) and payloads for the Space Shuttle. The history of overpressure effects on the Space Shuttle, the basic overpressure phenomenon, Space Shuttle overpressure environment, scale model overpressure testing, and techniques for suppressing the overpressure environments are considered. T.M.

N82-19300# Committee on Commerce, Science, and Transportation (U. S. Senate).
SPACE SHUTTLE OPERATIONS
Washington GPO 1982 59 p Hearing before the Subcomm. on Sci., Technol., and Space of the Comm. on Commerce, Sci., and Transportation, 97th Congr., 1st Sess., 9 Dec. 1981
(GPO-89-661) Avail: Subcommittee on Science, Technology, and Space

The space shuttle flights are discussed and the competition with the Ariane is analyzed. The size of the Orbiter fleet, the demand for communications satellites, and the modification of the Centaur for space shuttle support are also discussed. R.J.F.

N82-19301*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. SPACE SHUTTLE PROGRAM STS-3 LAUNCH
[1982] 26 p
(NASA-TM-84154; M-989-81-03) Avail: NTIS HC A03/MF A01 CSCL 22A

This STS-3 prelaunch report states the mission objectives and provides a detailed description of the STS-3 mission. A description of the STS-3 payload, OSS-1, and its mission objectives are included. S.L.

N82-19302*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
STRUCTURAL DYNAMIC ANALYSIS OF THE SPACE SHUTTLE MAIN ENGINE Final Report
Leland P. Scott, G. T. Jamison, W. A. McCutcheon, and J. M. Price Dec. 1981 166 p refs
(NAS8-33808)
(NASA-CR-161945; LMSC-HREC-TR-D784490) Avail: NTIS HC A08/MF A01 CSCL 21H

This structural dynamic analysis supports development of the SSME by evaluating components subjected to critical dynamic loads, identifying significant parameters, and evaluating solution methods. Engine operating parameters at both rated and full power levels are considered. Detailed structural dynamic analyses of operationally critical and life limited components support the assessment of engine design modifications and environmental changes. Engine system test results are utilized to verify analytic model simulations. The SSME main chamber injector assembly is an assembly of 600 injector elements which are called LOX posts. The overall LOX post analysis procedure is shown. S.L.

N82-19303*# National Aeronautics and Space Administration, Washington, D. C.
UPPER STAGE ALTERNATIVES FOR THE SHUTTLE ERA NASA/DOD Report to Congress
Oct. 1981 89 p refs Sponsored in part by DOD
(NASA-TM-84137) Avail: NTIS HC A05/MF A01 CSCL 22B

The status and general characteristics of Space Shuttle upper stages now in use or in development, as well as new vehicle possibilities are examined. Upper stage requirements for both civil and Department of Defense missions, categorized generally into near-term (early and mid-1980's), mid-term (late 1980's to mid-1990's), and far-term (late 1990's and beyond) are discussed. Finally, the technical, schedule and cost impact of alternative ways in which these requirements could be met are examined, and a number of conclusions and recommendations are reached. R.J.F.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

N82-19304# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DATA COLLECTION PLATFORMS: APPLICATIONS TO HYDROLOGY [PLATFORMAS DE COLETA DE DADOS: APLICACAO A HIDROLOGIA]
Jose Roberto deOliveira Oct. 1981 14 p refs In PORTUGUESE: ENGLISH summary Presented at 4th Brazilian Symp. on Hydrol. and Hydrol. Resources, 15-19 Nov. 1981
(INPE-2246-PRE/030) Avail: NTIS HC A02/MF A01

Data collection platforms which use artificial satellites as data relayers of meteorological data to receiving centers are discussed. The main systems available for data collection, and their advantages and limitations relative to hydrologic applications are discussed. R.J.F.

N82-19305# Mitre Corp., Bedford, Mass.
ANALYSIS OF MULTIPATH INTERFERENCE FOR APATS
G. A. Robertshaw Hanscom AFB, Mass. Electronic Systems Div. Dec. 1981 68 p refs
(Contract F19628-81-C-0001; AF Proj. 4290)
(AD-A108797; MTR-8366; ESD-TR-81-255) Avail: NTIS HC A04/MF A01 CSCL 09/6

Multipath propagation and the resulting interference are theoretically analyzed for a ballistic missile re-entry vehicle (RV) to aircraft telemetry link in order to predict performance parameters for the ARIA Phased Array Telemetry System (APATS). A basic two-path model incorporating direct and specularly reflected transmission is presented. Model calculations, which take into account RV and APATS antenna gain, polarization, sea state and Doppler shift, yield the depth and frequency of fade anticipated for several mission scenarios. RF fades associated with RV antenna pattern nulls and modulation distortion resulting from a combination of Doppler shift and relative path delay are tentatively identified as the principal sources of link degradation which will limit APATS support altitudes. Areas of continuing interest and work are described. Author (GRA)

N82-19306# Mitre Corp., Bedford, Mass.
ANALYSIS OF THE MULTIPATH ENVIRONMENT FOR APATS TESTING
G. A. Robertshaw Hanscom AFB, Mass. ESD Nov. 1981 51 p refs
(Contract F196 28-81-C-0001; AF Proj. 4290)
(AD-A109345; MTR-8391; ESD-TR-81-254) Avail: NTIS HC A04/MF A01 CSCL 09/6

Phase 2 of the ARIA Phased Array Telemetry System (APATS) test program will include tower-air-ground (TAG) testing of system sensitivity, tracking capability, and other functions. As presently envisioned, these test configurations involve propagation paths for which transmitter and receiver (APATS) heights are small relative to baseline separations and interference caused by multipath propagation must be considered in the context of the test objectives. A two-path propagation model which incorporates specular reflection from the Earth is developed and calculations are performed for typical test configurations. The anticipated effects and ramifications of multipath interference are discussed and specific test configurations are recommended. GRA

N82-19307# Centre National d'Etudes Spatiales, Toulouse (France). Groupe de Recherches de Geodesie Spatiale.
STUDY OF A COMSS HIGH ACCURACY POSITIONING SYSTEM: HIGH ACCURACY POSITIONING SYSTEM (HASP) Final Report [ETUDE D'UN SYSTEME DE POSITIONNEMENT PRECIS DE SATELLITE/RADAR ALTIMETRIQUE COMSS HASP (HIGH ACCURACY SYSTEM POSITIONING)]
F. Nouel and M. Berge Paris ESA 1981 116 p In FRENCH
(Contract ESA-4407/80/F-DD)
(CNES-85.55.00; ESA-CR(P)-1491) Avail: NTIS HC A06/MF A01

The development of a positioning system with 5 to 10 cm trajectory accuracy and 1 to 2 m orbital accuracy is discussed. Experience gained from existing satellites is adapted in order to develop calculation methods and to deduce the best approach. The proposed system has onboard processing of ranging and tracking data so as to have a single time and frequency reference for the entire tracking operation. It can operate under any weather conditions. Calculations are based on short arcs (half a revolution) with satellite and ground station positions established in relation to one another. The trajectory arc is calculated from a spherical harmonics based global potential model. Simulations for 650 and 850 km altitude show that a higher number of ground stations is needed for 650 km, but otherwise system accuracy is similar. Author (ESA)

N82-20122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ON THE GROUP DELAY EFFECT OF DSN MICROWAVE COMPONENTS ON MULTIMEGABIT TELEMETRY
P. J. Lee *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 59-65 ref (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09F

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-19308# European Space Agency, Paris (France).
RECENT ADVANCES IN SPACE STRUCTURE DESIGN-VERIFICATION TECHNIQUES
W. R. Burke, comp. Oct. 1981 78 p refs Proceedings held at Noordwijk, Netherlands, 27-28 Apr. 1981
(ESA-SP-1036; ISSN-0379-6566) Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The simulation of flight loads in order to verify the dynamic characteristics of space structures is treated. Remaining problems, improvement in techniques, and the engineering of alternative test methods are discussed. Procedures for compiling load diagrams, used in satellite design, which take into account payload/launch vehicle interaction are summarized. The dynamic characterstics of a 160 kN vibration table are determined as an example of test equipment modeling. For individual titles, see N82-19309 through N82-19312.

N82-19309# European Space Research and Technology Center, Noordwijk (Netherlands).
INTRODUCTION TO PROBLEMS OF STRUCTURAL DYNAMICS VERIFICATION
E. Nellessen *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 1-8 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The definition and simulation of mechanically induced flight loads which form the low frequency portion of the flight environment are addressed. This includes: the development of a method for design load definition; the development of reduction techniques for vibration test data and time histories obtained from launcher/spacecraft coupled analyses; and the identification of vibrator system characteristics for analyzing uncontrolled interaction between vibrator and test item. Techniques for flight environment simulation, including transient test methods and multi-axis testing, using servohydraulic facilities, are also considered as well as the improvement of modal coupling techniques, including statically indeterminate coupling and nonlinear joints, and the development of procedures for systematic updating of mathematical models on the basis of experimental data. Author (ESA)

N82-19310# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
DYNAMIC ANALYSIS AND MODELING OF ELECTRODYNAMIC VIBRATION TEST FACILITIES APPLIED TO THE AIBG 160 kN SYSTEM
T. Oeguet and K. Muehlbauer *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 9-25 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Mathematical dynamic models of a typical electrodynamic vibration exciter and of a slip table, including its hydrostatic bearings, are presented which can be coupled with test structure models in order to investigate problems of real vibration testing. Several of the model parameters were determined by direct measurement or calculation. Most of them, however, were obtained by fitting the calculated responses to the corresponding results of various dynamic tests performed with the test facility. The basic modelling procedure, the tests and analyses performed, and the models finally established are surveyed. Author (ESA)

N82-19311# Centre National d'Etudes Spatiales, Toulouse (France).
METHODOLOGY OF UNIAXIAL TRANSIENT VIBRATION TESTS FOR SATELLITES
B. Boissin, A. Girard, and J. F. Imbert *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 35-53 refs Submitted for publication (For primary document see N82-19308 10-18)
(Contract ESA-4160/79/NL-AK)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The problem of dependence of test specification on possible variations in launch vehicle and satellite dynamic characteristics is addressed. For most of the low frequency dynamic flight environment of a satellite, transient testing minimizes the risk of under or overtesting inherent to conventional sine testing. The feasibility of such tests on uniaxial electrodynamic shakers is cited. Realistic data for thrust transient, launch vehicle, and satellite characteristics are defined and dynamic response analysis is performed after a survey of current methods. Possible variations of parameters are identified and a sensitivity analysis is carried out. It is found that the frequency variations have the largest influence and must be considered simultaneously. A numerical procedure is developed that computes a worst shock spectrum envelope. Author (ESA)

N82-19312# Industrieanlagen-Betriebsgesellschaft m.b.H., Ottobrunn (West Germany).
ACHIEVEMENTS IN MULTI-AXES TESTING USING SERVOHYDRAULIC VIBRATION SYSTEM
W. Raasch *In* ESA Recent Advances in Space Struct. Design-Verification Tech. Oct. 1981 p 55-71 refs (For primary document see N82-19308 10-18)
Avail: NTIS HC A05/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A multi-axes vibration table is described which was used in tests conducted to prove the limitations of reproducing specified acceleration time histories in three dimensions. Besides the good reproduction accuracy of transient acceleration signals, results show essential elastomechanic properties of the test specimens can be determined, using multi-axes transients as excitations. This means a drastic reduction in test duration. It is also found that multi-axes excitation may cause an amplification of vibration level in one axis if the excitation level in the orthogonal axis is magnified. Nevertheless, transient excitations result in lower vibrational response than sine sweep excitation. Author (ESA)

N82-19313# British Aerospace Dynamics Group, Bristol (England). Space Systems Div.
GIOTTO COMET HALLEY MISSION, PHASE A STUDY. VOLUME 1: SPACECRAFT DESIGN Final Report
Paris ESA May 1980 125 p refs Prepared in cooperation with Dornier-Werke G.m.b.H., Friedrichshafen, West Germany (Contract ESA-4254/80/NL-MS)
(ESS/SS/1000; ESA-CR(P)-1489) Avail: NTIS HC A06/MF A01

A spacecraft for a post perihelion encounter with Comet Halley was designed. The GEOS design and hardware are used, subject to detail changes to subsystems. An X band telemetry system provides a bit rate of 40 Kbit/sec (under favorable weather conditions) using a despun, high gain, offset fed antenna. A dust shield protects the spacecraft from damage due to particle impact during encounter, the spin axis being aligned with the relative velocity vector. The spacecraft is suitable for Ariane launch, even if another payload is carried. Author (ESA)

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-19314# National Aerospace Lab., Tokyo (Japan).
A STUDY OF LIQUID HYDROGEN COOLED LO-2/LH-2 ROCKET COMBUSTOR WITH SLOTTED WALL LINER
Nobuyuki Yatsuyanagi, Masayuki Niino, Akinaga Kumakawa, Hiromi Gomi, Akio Suzuki, Hiroshi Sakamoto, Masaki Sasaki, and Eiji Sogame Aug. 1981 99 p refs In JAPANESE; ENGLISH summary
(NAL-TR-679; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

An experimental investigation of the combustion and the heat transfer characteristics of a liquid oxygen-liquid hydrogen rocket combustor was conducted. The liquid hydrogen cooled chamber with a slotted wall liner made of OFHC copper for coolant passage was designed for use at a thrust level of 300 kgf with a nominal combustion chamber pressure of 35 atm. The following results were noted. The regenerative cooling combustion tests at the design thrust and the combustion pressure were sucessfully performed. The slotted wall chamber was revealed to have a sufficiently high heat transfer rate and enough cooling

margin even in this small thrust level combustor. In the independent cooling experiments, a new thermal design equation was obtained, which should be recommended as the design equation for regeneratively cooled rocket engines. As a result, many design equations previously obtained from Joule heated tube experiments proved to be not suitable for the design of slotted wall combustors. .Author

N82-19315# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

THE DAEDUT/PMLTNO HYBRID ROCKET MOTOR FACILITIES

H. F. R. Schoeyer and P. A. O. G. Korting May 1981 39 p refs Prepared in cooperation with Prins Maurits Lab. TNO (VTH-LR-321; PML-1981-103) Avail: NTIS HC A03/MF A01

Hybrid rocket motors are introduced, and research/test facilities are described, including major system components and operational procedures. Aspects of the hybrid combustion process, which is characterized by the fuel and oxidizer being in different states of aggregation, are covered, including turbulence of oxidizer flow and fuel regression rate. A model of the combustion process is compared with experimental results for PMMA/oxygen; polyethylene/peroxide; rubber/nitric oxide; and polyethylene/oxygen. For PMMA/O2, the model agrees reasonably well with experiments, although at low pressures discrepancies between model and experiment are observed. Polyethylene and H2O2 also follow the predicted behavior. Doubts arise whether the model is applicable to metal enriched fuels. Only lithium enriched fuels show reasonable agreement between theory and experiment. Author (ESA)

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-19316# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THE SCIENCE AND ENGINEERING OF MATERIALS [DOCUMENTO SOBRE CIENCIA E ENGENHARIA DOS MATERIALS]

Jun. 1981 103 p refs In PORTUGUESE; ENGLISH summary (INPE-2138-RPE/361) Avail: NTIS HC A06/MF A01

Priorities in projects being developed in materials science and engineering are defined for the following sub-areas: semiconductors, ceramics, glasses, conjugate materials, catalysts, rubber, plastics, firewoods, materials for civil construction, and materials processed in space. The group tried to include in the discussions some aspects of social and economic relevance. When possible, the participation in the discussions of scientific and technological community representatives was not only permitted, but also supported. R.J.F.

N82-19317# State Univ. of New York at Buffalo. Dept. of Chemistry.

THE ATTEMPTED SYNTHESES OF LOW OXIDATION STATE, ORGANOMETALLIC DERIVATIVES OF ALUMINUM, GALLIUM AND INDIUM, A NEW SYNTHESIS Al(CH2SiMe3)3

O. T. Beachley, Jr., C. Tessier-Youngs, R. G. Simmons, and R. B. Hallock 19 Mar. 1981 20 p refs Submitted for publication

(Contract N00014-78-C-0562; NR Proj. 053-686)

(AD-A109333; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/3

The synthesis of KAl(CH2SiMe3)2 by a reductive elimination reaction between Al(CH2SiMe3)3 and KH has been attempted but a pure product could not be isolated. The reactants combine at 70 C to form KAl(CH2SiMe3)3H, a white pyrophoric solid, which has been fully characterized. A molecular weight study indicates the presence of a mixture of monomeric and dimeric species in benzene solution. The pyrolysis of KAl(CH2SiMe3)3H at 205 C produces Si(CH3)4 but also CH4. The formation of Si(CH3)4 suggests that KAl(CH2SiMe3)2 might have been formed but the presence of CH4 indicates that a decomposition reaction occurs either prior to or after the formation of KAl(CH2SiMe3)2. The reactions of mixtures of KH-Al(CH3)3, KH-Ga(CH3)3, NaH-Ga(CH3)3, KH-In(CH3)3 and NaH-In(CH3)3 have also been investigated in order to determine the role of the organic substituent in the attempted reductive elimination reactions. In all cases the formation of CH4 during pyrolysis of KAl(CH3)H, KGa(CH3)3H and the other reaction mixtures is consistent with the occurrence of reduction but no pure compounds could be isolated. A new synthetic route to Al(CH2SiMe3)3 from AlBr3 and LiCH2SiMe3 in refluxing hexane is also described.

Author (GRA)

N82-19318# Cornell Univ., Ithaca, N. Y. Dept. of Environmental Engineering.

SOLUTE-GAS EQUILIBRIA IN MULTI-ORGANIC AQUEOUS SYSTEMS Final Report

James M. Gossett and Andrew H. Lincoff 30 Nov. 1981 37 p refs

(Grant AF-AFOSR-0074-81; AF Proj. 2303)

(AD-A109082; AFOSR-81-0858TR) Avail: NTIS HC A03/MF A01 CSCL 07/3

The objective of this research was to study the effects of temperature, ionic strength, and presence of additional organics on the aqueous solution/gas equilibria of a variety of chlorinated organic compounds: 1,1,1-trichloroethane, tetrachloroethylene, trichloroethylene, chloroform, methylene chloride, and o-dichlorobenzene. Henry's Constant for each alone was determined in pure water over the temperature range, 10 deg - 30 deg C, using an equilibrium, batch stripping reactor. Data were fit to a regression equation. Henry's constants for selected organic solvents were determined at ionic strengths up to 1.0 M (KCl). Results suggest that ionic strength effects on activity can be ignored in systems processing ionic strengths less than 0.07 M. Henry's constants for organic solvents dissolved in multicomponent aqueous mixtures of other organic solvents were measured. It was found that relatively small concentrations of the organic solvents in water mutually affected one another's volatility.

Author (GRA)

N82-19319# Bundesanstalt fuer Geowissenschaften und Rohstoffe, Hannover (West Germany).

DEUTERIUM HYDROGEN ISOTOPE RATIOS IN ORGANIC MATTER, MINERAL OILS, AND NATURAL GASES Final Report, Mar. 1981

Martin Schoell Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 79 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-204; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16.80

The dependence of the D/H isotope ratio in mineral oils and natural gases on the type of oil source rock and its usefulness for oil exploration were investigated. A technique was developed capable of determining D/H ratios in organic matter with an accuracy of + or - 2 pro mille. Results show that the isotope ratio in oils are indeed transferred by the mother rocks. Exchange experiments demonstrate that this ratio is not affected by exchange with water, even on geological time scales. The deuterium concentration in the methane of thermally formed natural gases is shown to be dependent on the maturity of the source organic matter, not on the type of mather rock. Cross correlation between the C14/C13 and the D/H ratios of natural gas methanes leads to a genetic diagram characterizing the origin of these gases. A criterium was also developed for the identification of bacterial natural gases. Author (ESA)

24 COMPOSITE MATERIALS

Includes laminates.

N82-19320*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

BOLT CLAMPUP RELAXATION IN A GRAPHITE/EPOXY LAMINATE

K. N. Shivakumar and John H. Crews, Jr. Jan. 1982 32 p refs Presented at ASTM Symp. on the Long-Term Behavior of Composites, Williamsburg, Va., 9-10 Mar. 1982
(NASA-TM-83268) Avail: NTIS HC A03/MF A01 CSCL 11D

A simple bolted joint was analyzed to calculate bolt clampup relaxation for a graphite/epoxy (T300/5208) laminate. A viscoelastic finite element analysis of a double-lap joint with a steel bolt was conducted. Clampup forces were calculated for various steady-state temperature-moisture conditions using a 20-year exposure duration. The finite element analysis predicted that clampup forces relax even for the room-temperature-dry condition. The relaxations were 8, 13, 20, and 30 percent for exposure durations of 1 day, 1 month, 1 year, and 20 years, respectively. As expected, higher temperatures and moisture levels each increased the relaxation rate. The combined viscoelastic effects of steady-state temperature and moisture appeared to be additive. From the finite-element analysis, a simple equation was developed for clampup force relaxation. This generalized equation was used to calculate clampup forces for the same temperature-moisture conditions as used in the finite-element analysis. The two sets of calculated results agreed well. B.W.

N82-19321# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.
RELATIVE EFFECTS OF A GRAPHITE FIBER REINFORCED EPOXY COMPOSITE AND NICKEL-ALUMINUM BRONZE ON A CATHODIC PROTECTION SYSTEM IN SEAWATER Interim Report
Harvey P. Hack and Aleksander B. Macander Nov. 1981 28 p
(AD-A109078; DTNSRDC/SME-81/73) Avail: NTIS HC A03/MF A01 CSCL 11/4

This study was designed to quantify the cathodic efficiency of a graphite fiber reinforced epoxy laminated composite material by comparing the amount of zinc consumption from a sacrificial-anode cathodic protection system on the composite with the consumption due to a nickel-aluminum bronze in seawater. Specimens of the composite or of bronze were electrically coupled to anode zinc in seawater at flow velocities of 0 and 10 meters per second for up to 270 days. The composite did not cause a significantly different current demand than bronze on the zinc sacrificial cathodic protection system. It was noted that this represents a worst-case condition for the composite, since the specimens were deliberately prepared with the graphite-fiber ends exposed on the test surface. Author (GRA)

N82-19322# Vought Corp., Dallas, Tex.
THE DEVELOPMENT OF A LOW VELOCITY IMPACT METHODOLOGY FOR HYBRID MATERIAL SYSTEMS Final Report, Apr. 1980 - Apr. 1981
S. V. Hayes and E. F. Rybicki Jul. 1981 102 p refs
(Contract N00019-80-C-0265)
(AD-A109282; ATC-R-92000/1CR-63) Avail: NTIS HC A06/MF A01 CSCL 11/4

A design methodology for hybrid structures which describes the extent of damage and associated failure modes due to low velocity impact was undertaken. Hybrids can provide a synergistic improvement in damage resistance caused by foreign body low velocity impact over graphite/epoxy material and when properly designed, enhance the visual and NDI damage detection threshold of the baseline material. Improvements in the visible and NDI damage detectability threshold of graphite/epoxy material, subject to low velocity impact, via proper placement and use of Kevlar plies and metallic coatings within this baseline material were exhibited. Correlation between the math model and the damage tests was used to validate the model. Residual strength tests of damaged panels were run to quantify the static strength reduction experience. The math model was based upon physical parameters identified through experimental testing. These included transverse impact of hybrid and graphite-epoxy panels and tensile tests of the target materials at elevated strain rates. High speed photography of the impact events was used to provide dynamic modes of failure. GRA

N82-19323# Wyoming Univ., Laramie. Composite Materials Research Group.
MOISTURE AND THERMAL EXPANSION OF COMPOSITE MATERIALS M.S. Thesis. Interim Report
Douglas S. Cairns, Donald F. Adams, and David E. Walrath Nov. 1981 210 p refs
(Contract DAAG29-79-C-0189)
(AD-A109131; UWME-DR-101-104-1; ARO-16370.5-MS) Avail: NTIS HC A10/MF A01 CSCL 11/4

An experimental technique is presented for determining the moisture and thermal expansion coefficients of polymers, and polymer-matrix composite materials. Materials tested included Hercules 3501-6 neat epoxy resin, Hercules AS/3501-6 graphite/epoxy composite and Owens-Corning S2 glass fibers in the same Hercules 3501-6 epoxy matrix. Correlations of the experimentally determined moisture and thermal expansion properties with a nonlinear finite element micromechanics analysis are presented. Thermal expansion results for all three materials, both dry and moisture-conditioned, were obtained. Diffusivity constants were also experimentally determined. It is demonstrated that the moisture and thermal expansion of composite materials can be determined experimentally, and predicted numerically with generally good results. Author (GRA)

N82-19324# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
IMPROVEMENT OF THE X-RAY PROCEDURE FOR THE DETECTION OF DEFECTIVE ADHESIONS IN FIBER COMPOSITES BY ADDING CONTRAST SUBSTANCES TO THE ADHESIVES [VERBESSERUNG DES ROENTGENVERFAHRENS FUER DIE ERKENNBARKEIT VON FEHLKLEBUNGEN BEI FASERVERBUNDETEILEN DURCH BEIMENGUNG VON KONTRASTMITTELN IM KLEBSTOFF]
Bernd Lembke Bonn Bundesministerium der Verteidigung 1981 61 p refs In GERMAN; ENGLISH summary
(BMVg-FBWT-81-11) Avail: NTIS HC A04/MF A01; DOK-ZENTBw, Bonn DM 30

The detectability of defective adhesions in carbon fiber composites (CFC) by X-ray procedure is shown to be improved by increasing the absorption capacity of the adhesive, adding the contrast substances barium sulfate or aluminum. The adhesives BSL 313 A and AF 126-2 were tested with and without additives on metal-metal adhesion samples for strength and aging behavior and its defect detectability. The CFC laminate adhesions with defined defects were X-ray tested under various aging conditions with respect to tensile shearing strength, pealing resistance, shear deformation, and dynamic strength. The most favorable results were achieved with 12% of $BaSO_4$ added to BSL 313 A, or with 9% added to AF 126-2. Specifications for the production of the adhesive sheet are provided for these adhesive systems. Author (ESA)

N82-19325# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
DESIGN AND FUNCTION OF AN EXPERIMENTAL WING BOX USING CARBON FIBER REINFORCED EPOXY VATLIT-C'85 [ONTWERP EN FABRICAGE VAN EEN EXPERIMENTELE VLEUGELDOOS UITGEVOERD IN KOOLSTOFVEZEL VERSTERKTE EPOXY VATLIT-C'85]
W. H. M. vanDreumel and A. H. J. Verlaan Apr. 1981 13 p refs In DUTCH
(VTH-LR-318) Avail: NTIS HC A02/MF A01

Design and construction of an experimental wing torsion box for the VATLIT project are described. Carbon fiber reinforced epoxy was used, starting with a supporting skin. The filters are oriented under + or - 45 deg. The prismatic box is made of two identical parts, bolted together. The sandwich construction provides bending stiffness. The sandwich core material is Nomex. Unidirectional netto prepreg material added between the fibers drastically increases the glueing surface and improves uniform load transfer without extreme stress concentrations. The dimensioning of the 1100 x 600 x 160 mm box was based on a 85 kNm bending moment, a 46 kN cross-force and a 25.5 kNm torsion moment. Author (ESA)

N82-19326# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
A NEW FATIGUE RESISTANT MATERIAL: ARAMIDE REINFORCED ALUMINUM LAMINATE (ARALL)
L. B. Vogelesang, R. Marissen, and J. Schijve May 1981 40 p refs

(VTH-LR-322) Avail: NTIS HC A03/MF A01

A material for aircraft structures, obtained by adhesive bonding of a number of thin aluminum sheets and aramide weaves, is shown to have very favorable fatique crack growth properties and a high tensile yield strength, especially if favorable residual stresses are introduced in a laminate with optimal metal sheet laminate thickness. Results of corrosion fatigue tests, and comparative tensile and fatigue tests, carried out on centrally cracked specimens, lug type specimens, and on bolted joint specimens all of monolithic, laminated, and ARALL material, are given. Author (ESA)

N82-19327# Bristol Univ. (England). Dept. of Aeronautical Engineering.

SHEAR DIFFUSION IN SANDWICH SPECIMENS HAVING GLASS REINFORCED PLASTIC FACE PLATES WITH PAPER HONEYCOMB CORES B.S. Thesis

A. M. Ahmad Mustapha and C. K. Liew Jun. 1981 48 p refs

(BU-270) Avail: NTIS HC A03/MF A01

The behavior of a glass reinforced plastic (GRP) strap used to join the face plates of two separate GRP skinned, paper honeycomb sandwich specimens, subjected to tensile loads up to 1.5 kN was investigated. The paper honeycomb core was 8.8 mm thick with 1/8 in. cell size. The average thickness of each face plate was 0.5 mm. Results indicate that strap length and thickness taper of the strap influence the load diffusion process. Specimen length is found to have very little effect. The theoretical model developed gives good, but conservative, correlation with experimental results. Moduli of the specimen found from three point bending tests are Young's modulus of the face plates symptotic to 15,000 N/sq mm and shear modulus of the core asymptotic to 10 N/sq mm. Author (ESA)

N82-19328# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Materials Dept.

THE SIGNIFICANCE OF DEFECTS ON THE FAILURE OF FIBRE COMPOSITES

Sarah M. Bishop Dec. 1981 23 p refs Presented at the 53rd Meeting of the AGARD Struct. and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981

(AGARD-R-690; ISBN-92-835-1410-9) Avail: NTIS HC A02/MF A01

Defects produced during manufacture, cracking produced during loading, and in-service damage such as impact were studied together with their effects on mechanical properties and their implications for structural design. There is also work modelling the behavior of notched composites and on the design of composites to give improved toughness and increased tolerance to damage. R.J.F.

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics*.

N82-19329 Pennsylvania State Univ., University Park.

ANGULAR MOMENTUM ALIGNMENT IN NOZZLE EXPANSIONS OF GAS MIXTURES Ph.D. Thesis

William Raymond Sanders 1981 84 p

Avail: Univ. Microfilms Order No. 8129209

Nozzle expansions of gas mixtures containing I2 were examined to determine the degree of alignment of the axes of rotation of the I2 molecules. Conditions were chosen to produce a velocity difference between the components of the mixtures. Thus a test of the suggestion that nonisotropic velocity distributions in the flow enhance the degree of alignment occurring in molecular beams of nonspherical particles is provided. Classical trajectory calculations were carried out for 350 I2 molecules experiencing ten successive collisions with Ar atoms simulating a nozzle expansion exhibiting a significant degree of velocity slip. After each collision, the degree of alignment of the I2 molecules was determined. An argon ion laser was used to induce I2 fluorescence in expansions of I2 and CO2 from a slit nozzle. From measurements of the fluorescence intensities plane polarized parallel and perpendicular to the flow direction, the degree of polarization of the laser induced fluorescence was calculated. An equation is derived which relates I2 to the degree of polarization molecules used in the trajectory calculations. It is concluded that nonisotropic velocity distributions in the flow are necessary for the production of large degrees of alignment in light of the very small alignments found in earlier studies of pure I2 molecular beams. Dissert. Abstr.

N82-19330 California Univ., Berkeley.

EFFECT OF NUCLEAR SPIN ON CHEMICAL REACTIONS AND INTERNAL MOLECULAR ROTATION Ph.D. Thesis

Larry Lee Sterna 1981 352 p

Avail: Univ. Microfilms Order No. 8200285

The magnetic isotope effect is studied and results are presented for the separation of C13 and C12 isotopes. Two models are included in the theoretical treatment of the effect, and geminate recombination is calculated. Both models contain terms which account for loss of radicals due to competitive chemical reactions. The two reactions studied are photolysis of benzophenone and toluene and the photolytic decomposition of dibenzylketone(1,3-diphenyl-2-propanone). The theory and results for the use of Zeeman spin-lattice relaxation as a probe of methyl group rotation in the solid state are presented. Experimental results are presented for the time and angular dependences of rotational polarization, the methyl group magnetic moment, and methyl-methyl steric interactions. Dissert. Abstr.

N82-19331 Minnesota Univ., Minneapolis.

PERCOLATION AND CONDUCTION PHENOMENA IN DISORDERED COMPOSITE MEDIA Ph.D. Thesis

Philip Henry Winterfeld 1981 320 p

Avail: Univ. Microfilms Order No. 8126041

A model of a chaotic composite is presented. Space is subdivided into granular regions and a fraction of grains, chosen at random, are labeled conducting, the rest not. A chaotic composite is modeled as a continuum. A Voronoi tessellation is constructed. Algorithms are outlined to construct the tessellation in two and three dimensions and the tessellation's geometrical statistics are obtained. A two dimensional chaotic composite is modeled by selecting at random a given number of polygons in a tessellation and labelling them conducting, the rest nonconducting. Percolation properties obtained are the cluster distribution, the percolation threshold and the percolation probability. Conduction properties are obtained by a network reduction and by finite element analysis. Two finite element analyses arise, one from imposing a potential drop across the system and another from imposing a current flow through it, that yield upper and lower bounds to the conductivity, respectively. By refinement of the finite element technique, convergence of the bounds results. Percolation and conduction properties of composites generated from the Voronoi tessellation are compared to those from regular tessellations, i.e., the square, triangular and hexagonal.

Dissert. Abstr.

N82-19332 IEA Coal Research, London (England).

CHEMICAL DESULPHURISATION OF COAL

Geoffrey F. Morrison Jun. 1981 72 p refs

(ICTIS-TR-15; ISBN-92-9029-066-8) Copyright. Avail: Issuing Activity

The forms of organic and pyritic sulfur in coal and the chemical reactions these may undergo are assessed. Processes for the chemical cleaning of coal are described and evaluated, including wet oxidation, chlorinolysis, hydrothermal, microwave, and chemical comminution processes. The additional sulfur removed by chemical as compared to physical cleaning processes is insufficient to justify the additional complexity and cost of preparation. More research is required into the modes of occurrence and chemistry of sulfur in coal, particularly of organic sulfur, before the efficiency of the chemical cleaning of coal can be improved. Author (ESA)

N82-19333*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA REDOX CELL STACK SHUNT CURRENT, PUMPING POWER, AND CELL PERFORMANCE TRADEOFFS Final Report

Norman Hagedorn, Mark A. Hoberecht, and Lawrence H. Thaller Feb. 1982 33 p refs

(Contract DE-AI01-80AL-12726)

(NASA-TM-82686; DOE/NASA/12726-11; E-967) Avail: NTIS HC A03/MF A01 CSCL 10C

The NASA Redox energy storage system is under active technology development. The hardware undergoing laboratory testing is either 310 sq. cm. or 929 sq. cm. (0.33 sq. ft. or 1.0 sq. ft. per cell active area with up to 40 individual cells connected to make up a modular cell stack. This size of hardware allows rather accurate projections to be made of the shunt power/pump power tradeoffs. The modeling studies that were completed on the system concept are reviewed along with the approach of mapping the performance of Redox cells over a wide range of flow rates and depths of discharge of the Redox solutions. Methods are outlined for estimating the pumping and shunt current losses for any type of cell and stack combination. These methods are applicable to a variety of pumping options that are present with Redox systems. The results show that a fully developed Redox system has acceptable parasitic losses when using a fixed flow rate adequate to meet the worst conditions of current density and depth of discharge. These losses are reduced by about 65 percent if variable flow schedules are used. The exact value of the overall parasitics will depend on the specific system requirements of current density, voltage limits, charge, discharge time, etc. S.L.

N82-19334# Technische Hogeschool, Delft (Netherlands).

QUANTITATIVE THERMAL DESORPTION SPECTROMETRY OF NOBLE GASES IN SOLIDS Ph.D. Thesis

Aart vanGorkum 1981 157 p refs

Avail: NTIS HC A08/MF A01

Quantitative thermal desorption spectrometry carried out with the doses below limits to avoid the creation of surface disorder, the interaction of gas atoms during the desorption cycle, the retrapping of helium during the desorption cycle, and the multiple occupation of traps by helium is described. These limits are quantified, and it is shown that in general small amounts of gas have to be detected. The accuracy with which the energy E and frequency factor nu can be extracted from a measured 1st order desorption peak is ultimately limited by shot noise in the mass spectrometer. This noise is quantified for both the static and dynamic modes of operation. Examples are given showing that accuracies of approximately 1% can be obtained for peaks with 100 million practicles for practically achievable values of L and S. J.D.H.

N82-19335# Technische Hogeschool, Delft (Netherlands).

THERMAL INVESTIGATION OF UNSTABLE SUBSTANCES, INCLUDING A COMPARISON OF DIFFERENT THERMAL ANALYTICAL TECHNIQUES Ph.D. Thesis

Robert Bernard Barendregt 11 Feb. 1981 143 p refs

Avail: NTIS HC A07/MF A01

A procedure for the determination of the heat conductivity of a monatomic gas from measurements of the structure of the unsteady thermal boundary layer at the end wall of a shock tube is proposed. In the non-ionized case the structure of the boundary layer determined by means of laser schlieren measurements appears to be self similar. Improved analysis of the schlieren data and accurate pressure measurements yield heat conductivity data with an accuracy of 4% for temperatures up to 7000 K (argon, pressure 30,000 Pa to 100,000 Pa). There are still systematic errors of a few percent, due to the influence of side wall boundary layers and to the simplifications in the procedure for the determination of the state of the gas outside the boundary layer. In the ionized case a model for the development of the thermal boundary layer is proposed. S.L.

N82-19336*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A HIGH RESOLUTION SPECTROSCOPIC STUDY OF THE v SUB 2 BAND OF HYDROGEN SULFIDE AND THE 1-0 BAND OF HYDROGEN IODIDE Ph.D. Thesis - Maryland Univ.

Lawrence Larrabee Strow Dec. 1981 159 p refs

(NASA-TM-83852) Avail: NTIS HC A08/MF A01 CSCL 07D

A tunable diode laser spectrometer was constructed and used to study: (1) the effects of centrifugal distortion on the transition frequencies and strengths of the nu sub 2 band of H2S, and (2) nuclear quadrupole hyperfine structure in the 1-0 band of HI. A total of 126 line frequencies and 94 line strengths in the nu sub 2 band of H2S were measured. The average accuracy of the line frequency measurements was + or - 0.0016 cm. The line strengths were measured to an average accuracy of about 3 percent. The effect of the finite spectral width of the diode laser on the measurement of line strengths is discussed. The observed H2S line frequencies were fit to Watson's AS and NS reduced Hamiltonian in both the Ir and IIIr coordinate representations in order to determine the best set of rotation distortion constants for the upper state of the nu sub 2 band. Comparisons of the observed line strengths in this band to rigid rotor line strengths are also presented. Nuclear quadrupole hyperfine structure in the low J lines of the 1-0 band of HI was observed. The upper vibrational state nuclear quadrupole coupling constant, determined from the observed splittings, was -1850 MHz + or - 12 MHz or 1.2 percent + or - 0.7 percent larger than the ground state coupling constant. S.L.

N82-19337# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

INVESTIGATION OF A CaCl MOLECULAR JET BY MEANS OF LASER INDUCED FLUORESCENCE Thesis [UNTERSUCHUNG EINES CaCl-DUESENSTRAHLS DURCH LASERINDUZIERTE FLUORESZENZ]

Dietmar Otten Dec. 1980 61 p refs In GERMAN

(MPIS-29/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,85

Internal conditions in CaCl jet nozzles were investigated. The division of oscillation conditions is considered. The CaCl was chosen for its on the one hand completely different bonding characteristics, and on the other hand its well known absorption spectra in visible light, which makes it possible to penetrate it with continuous dye lasers. The structure of the CaCl molecule, the molecular beam activation, and fluorescent measurements are described. First measurements on CaCl jet nozzles for relaxation equations between oscillation and rotation during expansion with different carrier gases are also reported. Transl. by E.A.K.

N82-19338# Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.

STUDY OF THE MAGNETIC PHASE DEPENDENCE OF THE Ni-CO REACTION RATE Final Research Report, 1 Oct. 1976 - 30 Sep. 1981

M. S. Dresselhaus 13 Nov. 1981 7 p refs

(Grant AF-AFOSR-3130-77; AF Proj. 2301)

(AD-A108422; AFOSR-81-0776TR) Avail: NTIS HC A02/MF A01 CSCL 07/2

Our studies of the magnetic phase dependence of chemical reactions includes both an experimental and a theoretical program. We describe below progress made during the funding period of the grant in both the experimental and theoretical programs. The experimental program focused firstly on repeating previously reported observations of a strong, oscillatory magnetic field dependence of a chemical reaction, the carbonylation of Ni to form nickel carbonyl. Using a more sensitive experimental system than that of the previous workers, we were not able to repeat their reported results. The second experimental program focused on the observation of a change in reaction rate and activation energy of the chemical reaction due to a magnetic phase transition of the reacting substrate. This phenomenon was conveniently studied using nickel copper alloys to vary the Curie temperature. Cluster calculations for the energy levels showed that the addition of a single carbon monoxide group fills the d shell and leads to a diamagnetic complex. The third experimental program addressed the observation of the Hedvall effect in a reaction where the magnetic species was purely catalytic, namely the hydrogenation of ethylene on nickel copper surfaces. The theoretical modeling was carried out with a spin polarized calculation of the energy levels of an ethylene molecule bound to a nickel cluster. GRA

N82-19339# Ohio State Univ., Columbus. Dept. of Aeronautical and Astronautical Engineering.
IGNITION, COMBUSTION, DETONATION AND HEAT ADDITION TO ESTABLISHED FLOWS Interim Annual Report, 1 Apr. 1980 - 1 May 1981
R. Edse and T. D. Costello Aug. 1981 215 p refs
(Grant AF-AFOSR-3604-78; AF Proj. 2308)
(AD-A108580; AFOSR-81-0788TR) Avail: NTIS HC A10/MF A01 CSCL 21/2

Detonation Induction distances have been measured at room-temperature at various initial pressures in hydrogen-oxygen third gas mixtures. Various detonation parameters of these mixtures have been calculated at various initial temperatures down to 100K. A conical burner tube with a wide approach section has been set up to measure the normal flame speeds of various hydrogen-oxygen third gas mixtures at temperatures down to 200K. A new combustion tube is being assembled for the study of heat addition to an existing flow of air. Rigorous calculations have been made to evaluate the performance of ramjets using hydrogen or propane as fuel and flying at speeds ranging from M (infinity) = 1 to M (infinity) = 10.

Author (GRA)

N82-19340# Purdue Univ., Lafayette, Ind. School of Aeronautics and Astronautics.
DETERMINATION OF THE COMBUSTION MECHANISMS OF ALUMINIZED PROPELLANTS Annual Report, 1 Oct. 1980 - 30 Sep. 1981
J. P. Renie, H. M. Pressley, J. S. Lilley, and J. R. Osborn Bolling AFB, Washington, D.C. AFOSR 26 Oct. 1981 11 p refs
(Grant AF-AFOSR-3381-77; AF Proj. 2308)
(AD-A109058; AFOSR-81-0839TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

This research project is concerned with determining the mechanisms governing the formation and combustion of metal/agglomerate/metal oxide particles throughout the solid rocket motor, that is, surface/near surface, cavity, and nozzle regions. Also of concern is the influence these particles have on propellant combustion characteristics and motor performance. The efforts of this past year were directed toward developing the experimental equipment needed for determining particle size distributions at and near the propellant surface. A solid propellant strand window bomb with a servo controlled positioning device was constructed and operated. Also, the interface of this equipment with data recording and reduction equipment was accomplished. The laser imaging device to be used to measure particle size distributions is undergoing calibration tests.

Author (GRA)

N82-19341# National Bureau of Standards, Washington, D.C. Surfaces Science Div.
CONFIGURATIONAL EFFECTS IN THE ADSORPTION OF HD ON ZnO
G. L. Griffin and J. T. Yates, Jr. Dec. 1981 12 p refs Submitted for publication
(Contract N00014-81-F-0008)
(AD-A109368; TR-24) Avail: NTIS HC A02/MF A01 CSCL 07/4

Hydrogen deuterate, (HD) adsorption on ZnO surfaces has been studied by infrared spectroscopy as a function of ZnO temperature. It is shown that at 300K, the configuration Zn(H)-O(D) is preferred, as expected on thermodynamic grounds. As the temperature is lowered, the configuration Zn(D)-O(H) becomes preferred on kinetic grounds. We demonstrate that configuration reversal on heating must proceed via HD desorption and subsequent re-adsorption. This behavior is consistent with a model in which the transition state for HD adsorption is characterized by nearly complete dissociation of the H-D bond.

GRA

N82-19342# Naval Research Lab., Washington, D. C.
WEAK AND STRONG IGNITION. 2: SENSITIVITY OF THE HYDROGEN-OXYGEN SYSTEM Interim Report
E. S. Oran and J. P. Boris 7 Dec. 1981 39 p refs
(RR0130144; ZF43451001)
(AD-A108843; NRL-MR-4671) Avail: NTIS HC A03/MF A01 CSCL 21/2

This paper identifies the physical and chemical mechanisms which cause certain mixtures of hydrogen, oxygen and argon to be very sensitive to sound wave or entropy (temperature) perturbations. Detailed simulations of the effects of sound waves in typical mixtures are used to show explicity the effects of such fluctuations on the chemical induction time. A quantity delta TAU max, is defined which represents the maximum variation produced in the chemical induction time of a system given the amplitude and frequency of a perturbation. It is observed that these perturbations may cause ignition to occur unevenly in such mixtures and this leads to ignition which appears spotty. Using detailed numerical simulations and a generalized induction parameter model derived from it, delta TAU max is evaluated and a criterion is developed for spotty and smooth ignition behind reflected shock waves. These effects are related to weak and strong ignition observed in shock tube experiments.

Author (GRA)

N82-19343# Federal Aviation Administration, Atlantic City, N.J.
WORKSHOP ON MATHEMATICAL FIRE MODELING
Aug. 1981 227 p Workshop held 24-27 Mar. 1981
(AD-A108876; FAA-CT-81-209) Avail: NTIS HC A11/MF A01 CSCL 01/2

Computerized simulation of aircraft fires is discussed. Cabin fires are emphasized with particuliar attention given to the study of the flammability of construction materials. Three types of aircraft fires are analyzed: ramp fires, in-flight fires, and post crash fires. Flame spread, heat fluxes, and fire dynamics are discussed.

R.J.F.

N82-19344# Texas Univ. at Arlington. Dept. of Chemistry.
PHOTOASSISTED REACTIONS ON DOPED METAL OXIDE PARTICLES Technical Report, 1 Jan. - 31 Dec. 1981
J. M. White 31 Dec. 1981 28 p refs Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A109383; TR-21) Avail: NTIS HC A03/MF A01 CSCL 07/5

Photoassisted reactions involving doped metal oxide semiconductor powders are reviewed. The mechanisms, insofar as they are now understood, are discussed for several reactions involving gas phase water near its equilibrium vapor pressure in contact with the oxide. Experimental results are presented along with some discussion of how these processes may be involved with heterogeneous processes in the atmosphere. Author (GRA)

N82-19345# Wisconsin Univ. - Madison.
STUDY OF PHOTOPHYSICAL PROCESSES AND MOLECULAR TRANSFORMATIONS OF EXCITED STATES Final Report, 25 Sep. 1978 - 24 Sep. 1981
Howard E. Zimmerman 14 Dec. 1981 17 p
(Grant DAAG29-78-G-0204)
(AD-A109137; ARO-15917.3-C) Avail: NTIS HC A02/MF A01 CSCL 05/2

A brief description, including bibliography and personnel, is given for 26 years of ARO support. The areas of photophysical processes and molecular transformations of excited states are reported. Author (GRA)

N82-19346# Georgetown Univ., Washington, D.C. School of Engineering and Applied Science.
MULTIANGULAR SCANNING ABSORPTION-EMISSION TECHNIQUES FOR THREE-DIMENSIONAL COMBUSTION DIAGNOSTICS Annual Report, 1 Sep. 1980 - 30 Aug. 1981
Robert Goulard 1 Dec. 1981 14 p refs
(Contract AF-AFOSR-3439-77; AF Proj. 2308)
(AD-A109060; AFOSR-81-0857TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

This program explores the potential of absorption techniques for low ppm, real time 3-dimensional combustion diagnostics. In the current phase of activity, a laser beam has been transformed into a sheet of light and made to converge on a 126-element array, with electronics suitable for repeatable 1.5 KHz scanning and data processing. Available memory modules (4K) allow for 34 successive slicings of a passing target within 20 milliseconds. In this manner, a detailed projection of three-dimensional flow field concentrations is available. An axisymmetrical flow (tobacco smoke rings) has been measured and a tomographic procedure

was applied to these data. Better ranges of absorption are being considered and multiangular experiments (non-symmetrical cases) will follow. The construction of a portable tomographic unit is also in progress. It was upgraded to nonsteady flow capabilities by coupling a CAMAC digitizer with a MINC minicomputer. The source and sensor part of the experiment have been completed. Data processing and flow controls will follow. A theoretical review of flow instabilities is underway. Existing qualitative work suggests three-dimensional patterns for which this tomographic approach is ideally suited. Author (GRA)

N82-19347# Illinois Univ. at Urbana. Dept. of Aeronautical and Astronautical Engineering.

INITIATION, COMBUSTION AND TRANSITION TO DETONATION IN HOMOGENEOUS AND HETEROGENEOUS REACTIVE MIXTURES: A SUMMARY Final Report, 1 Jun. 1980 - 31 May 1981

Roger A. Strehlow, Harold O. Barthel, and Herman Krier Sep. 1981 76 p refs

(Grant AF-AFOSR-3336-77; AF Proj. 2308)

(AD-A109057; AFOSR-81-0840TR) Avail: NTIS HC A05/MF A01 CSCL 21/2

Certain aspects of ignition source effects in reactive fuel-air mixtures are discussed. These aspects include effects of chemical sensitizers, flame acceleration, flame area, and ignition point location. The other area involves the hydrodynamic modeling of ignition and flamespreading in granular energetic solids to predict the potential for deflagration-to-detonation transition (DDT). Key results in the first area are that chemically sensitized clouds can lead to detonation, that flame acceleration or a large increase in the time rate of increase of the flame area are needed for transition from deflagration to detonation and that it is very difficult to generate damaging overpressure from edge-ignited combustion even for very high subsonic burning velocities. The research dealing with analysis of DDT in porous high energy solid propellant has shown (for the first time) actual steady-state detonation solutions, following the unsteady flow, for materials with sufficient porosity and critical burning rate properties. Limits of the run-up length to detonation are predicted as a function of propellant chemical energy, burning rate, bed porosity, and granulation (size). The detonation states conform to realistic measured conditions for porous HMX and RDX propellants. GRA

N82-19348# Michigan State Univ., East Lansing. Dept. of Chemistry.

ELECTRON EXCHANGE BETWEEN BiS (ETA MESON-6-ARENE) CHROMIUM (I) AND BiS (ETA MESON-6-ARENE) CHROMIUM (O). COMPARISONS BETWEEN EXPERIMENTAL AND CALCULATED KINETICS PARAMETERS

Tomi T-T. Li, Michael J. Weaver, and Carl H. Brubaker, Jr. 15 Dec. 1981 26 p refs Submitted for publication

(Contract N00014-79-C-0670)

(AD-A109051; TR-7) Avail: NTIS HC A03/MF A01 CSCL 07/3

Comparisons have been made between kinetics parameters for the self exchange of (eta(6)-arene)2Cr(I)/(eta(6)-arene)2Cr(O) (where arene = benzene, toluene, methoxylbenzene, biphenyl, ethylbenzoate and chlorobezene) measured by ESR line broadening in dimethylsulfoxide, with the predictions from contemporary electron-transfer theory. The biphenyl system was additionally studied in a number of other solvents. These reactions provide especially tractable systems with which to test theories of outer-sphere electron transfer since the work terms should be essentially zero, and the inner-shell contributions. Delta G to the free energy barrier are small and can be estimated from infra-red spectroscopy combined with crystallographic data. These were found to be somewhat (ca. 5-20 fold) larger than the corresponding frequency factors derived from the experimental activation enthalpies combined with the dielectric continuum estimates of the activation entropies. These 'experimental' frequency factors are compared with the estimates obtained from the 'reactive collision' and the 'ion-pair pre-equilibrium' models. The majority of the experimental frequency factors were found to be numerically closer to the predictions of the former model. GRA

N82-19349# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

MEASUREMENT OF THE DIFFERENTIAL SCATTERING CROSS SECTIONS OF ELECTRON EXCITED SODIUM BY ARGON Thesis [MESSUNGEN DIFFERENTIELLER STREUQUERSCHNITTE VON ELEKTRONISCH ANGEREGTEM NATRIUM AN ARGON]

Rainer Liedtke Dec. 1980 70 p refs In GERMAN

(MPIS-31/1980; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13,50

Differential scattering profiles with thermal energy caused by electron excited sodium by argon was measured. A grouping of crossed molecular beams was applied. A combination of Langmuir-Taylor detectors with a particle multiplier allowed measurement improvement of dissolving capacity which is needed to measure fast oscillation. The dominating elastic process allows concentration on classic scattering theory. Transl. by E.A.K.

N82-19350# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

INTEGRAL TOTAL COLLISION AND IONIZATION CROSS SECTIONS FOR THE INTERACTION OF EXCITED He IN THE (2/SUPER 1/S, 2/SUPER 3/S) STATE WITH Ar IN THE THERMAL ENERGY RANGE Ph.D. Thesis - Georg-August Univ. [INTEGRALE TOTALE STOSS- UND IONISATIONSQUERSCHNITTE FUER H3 (2/SUPER 1/S 2/SUPER 3/S)-Ar IM-THERMICHEN ENERGIEBEREICH]

Siegfried Burdenski Dec. 1980 84 p refs In GERMAN

(MPIS-32/1980; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,75

Integral profiles of total and Penning ionization profiles of the He - Ar were measured by singlet and triplet system. Collision with good velocity resolution of ionization profiles were determined. It is found that it is possible, despite the simplicity of the two body impact, to apply a theoretical curve on measurements of complicated anelastic processes. One channel measurements rated two very interdependent dimensions providing the real component and the imaginary component of the potentials. Transl. by E.A.K.

N82-19351# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).

KINETIC INVESTIGATIONS OF THE REACTIONS OF UFG IN THE GASEOUS PHASE Ph.D. Thesis - Georg-August Univ. [KINETISCHE UNTERSUCHUNGEN VON REAKTTONEN DES UF6 IN DER GASPHASE]

Karin Rienaecker Feb. 1981 158 p refs In GERMAN

(MPIS-1/1981; ISSN-0436-1199) Avail: NTIS HC A08/MF A01; Fachinformationszentrum Karlsruhe, West Germany DM 26,70

Gas phase reactions of elementary fluorides which have taken place since the development of HF lasers, and the F2 reaction which are matching to the conversion of other halogens were investigated. The kinetic reaction of UF6 with HBr is examined. The occurrence of the establishment of an interference free test of gaseous phase reactions is shown. The hydrogen halide reaction and conversion with clear hydrogen, especially the reaction with H-atoms, is also discussed. Transl. by E.A.K.

N82-19352# Sheffield Univ. (England). Dept. of Control Engineering.

ON THE CONTROL OF COCURRENT TUBULAR CHEMICAL REACTORS

S. P. Banks and A. A. N. Al-shawi Oct. 1981 16 p refs

(RR-160) Avail: NTIS HC A02/MF A01

A dynamic model of a nonadiabatic tubular reactor in the form of a set of partial differential equations by using mass and energy balance to study optimal control was obtained. Distributed parameter theory is used to derive optimal control criteria from an infinite dimensional Riccati equation, without consideration of Laplace transforms in t and z. The mean squared error of the actual and equilibrium states is used as the cost functional, since the dynamic equations are obtained as a linearization of the true nonlinear dynamics about the equilibrium states. On-line calculations required are for the Fourier coefficients of system state and for the summations involved in feed flow rates and absolute temperatures. Author (ESA)

N82-19353# National Training and Operational Technology Center, Cincinnati, Ohio.
INORGANIC ANALYSES IN WATER QUALITY CONTROL PROGRAMS: INSTRUCTOR'S GUIDE
Audrey Kroner Jul. 1981 253 p refs
(PB82-111378; EPA-430/1-81-016) Avail: NTIS HC A12/MF A01 CSCL 07D

This manual is designed for use by instructors who will have to teach others how to perform analyses for selected inorganic pollutants. Topics related to the presentation of training courses in which the analyses would be taught include: the course description, personnal needed to conduct the training, the course agenda, a milestones list for planning and preparing the course, instructional resources available to support the instruction and a list of equipment and supply requirements. Also included are instructional package worksheets (lesson plans) giving details relative to presenting instruction regarding each of the analyses covered in the associated student training manual. GRA

N82-19354# Princeton Univ., N. J.
ON THE DISRUPTIVE VAPORIZATION AND BURNING OF EMULSIFIED AND MULTICOMPONENT FUEL DROPLETS Ph.D. Thesis
Juan Carlos LasherasToralba 1981 246 p
Avail: Univ. Microfilms Order No. 8129595

Systematic experimental studies of the combustion and vaporization properties of isolated free droplets of emulsified and multicomponent fuel droplets were conducted. For the case of emulsified fuel droplets the liquid-phase disruption is caused by the internal boiling of the dispersed-phase when the droplet temperature reaches the superheat-limit temperature of the dispersed-phase in the emulsion. For the case of water-in-fuel emulsions it is shown that the liquid-phase disruption is primarily governed by a very fast growth of the water vapor bubbles which is controlled by the large pressure difference between the vapor and the surrounding liquid. The experimental results substantiate the theory that the disruptive phenomena results from the homogeneous bubble nucleation of the superheated droplet core when the droplet temperature reaches the superheat-limit temperature of the solution. The concept of liquid-phase disruption is extended to practical solution and emulsions formed by the addition of methanol, ethanol or water to a conventional distillate fuel oil. Dissert. Abstr.

N82-20133# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
EXPERIMENTAL DETERMINATION OF TEMPERATURE/VELOCITY PROBABILITY DENSITY FUNCTIONS IN A TURBULENT FLAME
P. Moreau *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 9-20 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 233-244 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-19355 British Library Lending Div., Boston Spa (England).
MIXED CONVECTION IN MOLTEN METALS [LA CONVECTION MIXTE DANS LES METAUX EN FUSION]
J. Huetz (CNRS) 25 Feb. 1981 22 p refs Transl. into ENGLISH from La Houille Blance (France), no. 2/3, 1979 p 175-182
(BLL-RISLEY-TR-4385-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Mixed convection gives rise to thermal exchanges due to natural convection as well as those resulting from forced convection. The relative importance of these two exchange processes is determined by the value of the Froude number, namely the quotient of the Reynolds number and the square root of the Grashof number. The industrial sectors concerned with flows of liquid metal are defined. The heat transfers to which the latter are subjected are; nonisothermal conditions created by the imperatives of working a metal product, and molten metals used as heat transfer fluids. Iron, steelmaking, and energy production are emphasized. S.L.

N82-19356 Defence Research Information Centre, Orpington (England).
MAGNETIC PROPERTIES OF COPPER ALLOYS
D. Arnaud Nov. 1981 11 p refs Transl. into ENGLISH of Fonderie (France), no. 293, Aug.-Sep. 1970 p 293-297
(DRIC-T-6498; BR81313) Copyright. Avail: Issuing Activity

The magnetic properties of copper, bronzes, brasses, aluminum bronzes and German silver are summarized. Pure copper is scarcely affected by magnetic fields, but even very low iron contents have a perceptible influence. If bronze is to be nonmagnetic, iron content must be < 0.05%. For brasses, a soaking treatment (1 hr at 800 to 850 C) followed by rapid cooling lowers susceptibility to magnetic field action. Manganese and iron can increase susceptibility. Binary alloys (Fe in traces) have a susceptibility of 0.0000002. Magnetism is present from 0.15% iron concentration. This limit is raised to 0.5% after quenching at 900 C. German silver alloys are safest, since the critical iron content is lower (0.5%) than for the other copper alloys. Author (ESA)

N82-19357*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ENVIRONMENTAL DURABILITY OF ELECTROPLATED BLACK CHROMIUM
James R. Lowery Dec. 1981 13 p refs
(NASA-TM-82454) Avail: NTIS HC A02/MF A01 CSCL 11F

A study was undertaken to determine the durability of nickel-black chromium plated aluminum in an outdoor rural industrial, and seacoast environment. Test panels were exposed to these environments for 60, 36, and 13 months, respectively. The results of this study showed that no significant optical degradation occurred from exposure to either of these environments, although a considerable amount of corrosion occurred on the panels exposed to the seacoast environment. The rural and industrial atmosphere produced only a slight amount of corrosion on test panels. Author

N82-19358*# Rockwell International Corp., El Segundo, Calif. Aircraft Operations.
EVALUATION OF SUPERPLASTIC FORMING AND CO-DIFFUSION BONDING OF Ti-6Al-4V TITANIUM ALLOY EXPANDED SANDWICH STRUCTURES Technical Report, May 1979 - Dec. 1980
G. H. Arvin, L. Israeli, J. H. Stolpestad, and G. W. Stacher Sep. 1981 134 p refs
(Contract NAS1-15788)
(NASA-CR-165827; NA-81-185-1) Avail: NTIS HC A07/MF A01 CSCL 11F

The application of the superplastic forming/diffusion bonding (SPF/DB) process to supersonic cruise research is investigated. The capability of an SPF/DB titanium structure to meet the structural requirements of the inner wing area of the NASA arrow-wing advanced supersonic transport design is evaluated. Selection of structural concepts and their optimization for minimum weight, SPF/DB process optimization, fabrication of representative specimens, and specimen testing and evaluation are described. The structural area used includes both upper and lower wing panels, where the upper wing panel is used for static compression strength evaluation and the lower panel, in tension, is used for fracture mechanics evaluations. The individual test specimens, cut from six large panels, consist of 39 static specimens, 10 fracture mechanics specimens, and one each full size panel for compression stability and fracture mechanics testing. Tests are performed at temperatures of -54 C (-65 F), room temperature, and 260 C (500 F). B.W.

N82-19359# Helsinki Univ. of Technology, Espoo (Finland). Inst. of Process Metallurgy.
ACTA POLYTECHNICA SCANDINAVICA. OXYGEN-METAL (Ag, Au, Bi, Cu, In, Ni, Sb, Sn, Te) INTERACTIONS IN DILUTE MOLTEN LEAD ALLOYS Ph.D. Thesis

Anja Taskinen 1981 45 p refs
(ISBN-951-666-137-3; ISSN-0001-6853) Avail: NTIS HC A03/MF A01

Measurement of the first order interaction coefficients of nine metals on oxygen in liquid lead using a solid electrolyte cell is described. The lead oxygen system was studied first in order to check the reliability of the experimental apparatus. The Gibbs energy of dissolution of oxygen in liquid lead, the self interaction coefficient of oxygen in liquid lead, and first order action coefficients of the metals are reported and compared with previous findings in the literature. Application of the model of McLellan to Pb-Metal-O solutions and of the quasichemical model of Jacob and Alcock is considered. The entropy interaction coefficient was observed to be a linear function of the enthalpy interaction coefficient. J.D.M.

N82-19360*# Pratt and Whitney Aircraft, East Hartford, Conn.
TAILORED PLASMA SPRAYED MCrAlY COATINGS FOR AIRCRAFT GAS TURBINE APPLICATIONS
F. J. Pennisi and D. K. Gupta Jan. 1981 132 p refs
(NAS3-21730)
(NASA-CR-165234; PWA-5642-21) Avail: NTIS HC A07/MF A01 CSCL 11F

Eighteen plasma sprayed coating systems, nine based on the NiCoCrAly chemistry and nine based on the CoCrAly composition, were evaluated to identify coating systems which provide equivalent or superior life to that shown by the electron beam physical vapor deposited NiCoCrAly and CoCrAly coatings respectively. NiCoCrAly type coatings were examined on a single crystal alloy and the CoCrAly based coatings were optimized on the B1900+ Hf alloy. Cyclic burner rig oxidation and hot corrosion and tensile ductility tests used to evaluate the various coating candidates. For the single crystal alloy, a low pressure chamber plasma sprayed NiCoCrAly + Si coating exhibited a 2x oxidation life improvement at 1394 K (2050 F) over the vapor deposited NiCoCrAly material while showing equivalent tensile ductility. A silicon modified low pressure chamber plasma sprayed CoCrAly coating was found to be more durable than the baseline vapor deposited CoCrAly coating on the B1900+ Hf alloy. S.L.

N82-19361 Aeronautical Research Labs., Melbourne (Australia).
ACCESSION OF TITANIUM AS AN AIRCRAFT MATERIAL: A CURRENT VIEW
H. R. Chin Quan Mar. 1981 24 p refs
(ARL/Mat-Note-129; AR-002-280) Copyright. Avail: Issuing Activity

The metallurgy, alloy development, fabrication, and property characteristics of titanium alloys for aircraft structural applications are presented. Alloy compositions and a general bibliography of titanium references are included. S.L.

N82-19362# Connecticut Univ., Storrs. Inst. of Materials Science.
INTERACTION OF MICROSEGREGATION AND COARSENING DURING DENDRITIC NICKEL-BASE ALLOY MONOCRYSTAL GROWTH Final Report, 1 Apr. 1977 - 31 Aug. 1981
T. Z. Kattamis 31 Oct. 1981 57 p refs
(Grant AF-AFOSR-3344-77)
(AD-A108980; UC-MET-KAT-4-1981; AFOSR-81-0860TR) Avail: NTIS HC A04/MF A01 CSCL 11/6

Dendritic monocrystals of various Ni-Al-Ta and Ni-Cr alloys, some of which were microalloyed with C,B,Zr or Hf were processed at various growth rates up to 200 cm/h, or cooling rates up to 4.44 K/s under a thermal gradient in the mushy zone of 80 K/cm and in some cases 180 K/cm. The solidification microstructure was substantially refined with increasing growth rate and dendrite arm spacings as fine as 1 to 2 micrometer were observed in laser or electron beam surface glazed monocrystals. Microsegregation of Al, Ta and Cr was found to depend on growth conditions. With increasing cooling rate the volume fraction of nonequilibrium interdendritic upsilo minus upsilo prime eutectic or secondary upsilo prime increases. At the high growth rates achieved in surface glazing this volume fraction is greatly reduced. Very high growth rates are required for complete elimination of interdendritic upsilo prime through solute trapping, and formation of a completely homogeneous surface layer. With the present chilling techniques available growth of homogeneous monocrystals at such high rates is not possible. GRA

N82-19363# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
THE EFFECT OF SURFACE COATINGS ON THE FATIGUE STRENGTH OF ALUMINUM ALLOYS
Dario A. Emeric, Sidney Levine, and Kathryn L. Washburn Sep. 1981 23 p refs
(DA Proj. 1L1-61101-89-18)
(AD-A108869; MERADCOM-2339) Avail: NTIS HC A02/MF A01 CSCL 11/3

Aluminum is a widely used metal in military applications such as vehicles, bridges, air-cushion vehicles, etc., but its use is limited to areas where the aluminum alloys would not be under load with variable or constant stresses and to areas where there would be almost no severe abrasion or corrosion. Anodic coatings tend to increase the abrasion and corrosion resistance of aluminum and its alloys, but the coatings have a detrimental effect on the fatigue endurance (in some instances by as much as 65 percent). The objective of this work was to provide a surface treatment and/or coatings that will allow the use of aluminum wrought alloys in any type of environment and that will be able to withstand the effects of abrasion and stress corrosion and temperature changes up to 344 deg F with an increased fatigue endurance. Author (GRA)

N82-19364# Massachusetts Inst. of Tech., Cambridge.
GRAIN-COARSENING RESISTANCE AND THE STABILITY OF SECOND-PHASE DISPERSIONS IN RAPIDLY SOLIDIFIED STEELS Technical Report, Oct. 1980 - Sep. 1981
G. B. Olson, H. C. Ling (Western Electric Engineering Research Labs., Princeton, N.J.), J. S. Montgomery, J. B. VanderSande, and M. Cohen 1 Dec. 1981 9 p refs Presented at the Mater. Res. Soc. Symp. on Rapid Solidification Crystalline and Amorphous Mater., Boston, 17-19 Nov. 1981
(Contract N00014-81-K-0013)
(AD-A109152; TR-1) Avail: NTIS HC A02/MF A01 CSCL 11/6

Control of alloy composition and processing to achieve grain coarsening resistance in rapidly solidified alloys is examined via the theory of grain boundary pinning and particle coarsening. The principles are illustrated for the case of manganese sulfides in steels. A thermodynamic survey of potential stable dispersed phases identifies TiN and rare-earth sulfides as particularly promising for alloy development via rapid solidification. Author (GRA)

N82-19365# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
A STUDY OF DISLOCATION DENSITY AND PHASE ELONGATION AS A FUNCTION OF DEFORMATION IN SINTERED TUNGSTEN COMPOSITES [EN STUDIE AV DISLOKATIONSTAETHETEN OCH FASTOEJNINGEN SOM FUNKTION AV DEFORMATION I SINTRADE VOLFRAM-KOMPOSITER]
Ulf Lindegren Oct. 1981 37 p refs In SWEDISH
(FOA-C-20428-D4) Avail: NTIS HC A03/MF A01

Dislocation density and phase elongation are calculated from the observed dislocation density in the tungsten grains. The studied composite is a DXT alloy. It contains 90% W, 6% Ni, and 4% Fe. In the sintered form, it consists of tungsten grains embedded in a weaker matrix. Such composites are used for armor piercing projectiles. Electron microscopes were used to determine the dislocation density. Results show the difference in the dislocation density values of the matrix and the tungsten grains measured for a total deformation up to 5%. For higher deformations, calculated values are indicated, based on theoretical models. A method is described for producing thin films by electropolishing and ion implantation. Author (ESA)

N82-19366# Thyssen Edelstahlwerke A.G., Krefeld (West Germany). Forschungsinst.
INFLUENCE OF FABRICATION CONDITIONS AND STABILITY OF AUSTENITE ON THE FORMING BEHAVIOR OF AUSTENITIC STAINLESS STEELS Final Report
Werner Kueppers Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 89 p refs In GERMAN; ENGLISH

summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-192; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 18,90

The effect of cold rolling conditions on austenitic steel stretching and deep drawing properties is discussed. During the fabrication of three coils of various stability of austenite, the degree of cold forming between the annealing processes was varied by cold rolling from the thickness of hot rolled coil to final thickness without, or with one or two, intermediate annealings. It is shown that the best stretch forming is made with unstable austenitic steels, and becomes better with increasing sheet thickness. The most favorable deep drawing behavior is gained with highest degrees of cold rolling before final annealing and is independent of the stability of austenite. Cold rolling to the highest degree before intermediate annealing and deformation before final annealing are important. It is found that conditions can be given for cold rolling to obtain best forming behavior.
Author (ESA)

N82-19367# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
FATIGUE CRACK GROWTH IN ALUMINUM ALLOYS
L. B. Vogelesang Jun. 1981 19 p refs Presented at 5th Intern. Conf. on Fracture, Cannes, France, 29 Mar. - 3 Apr. 1981
(VTH-LR-324) Avail: NTIS HC A02/MF A01

Fatigue crack propagation tests with different wave shapes were carried out in vacuum, air, and salt water, on 7075-T6 and 7024-T3 center-cracked sheet specimens. Scanning electron microscope studies of plastic castings of the fatigue cracks are discussed. Crack growth is shown to be sensitive to the loading rate during uploading and relatively insensitive to holding periods. The observations support a model for crack growth based on the synergistic effects of crack tip plasticity and the environmental contribution to tensile decohesion. Author (ESA)

N82-19368# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
CORROSION OF CARBON STEEL AT HIGH TEMPERATURE IN REDUCING CHEMICAL CONDITIONS
P. A. Borroni, E. Diacci, R. Rizzi, and C. Ronchetti 1981 20 p refs Presented at 8th Intern. Congr. on Metal. Corrosion, Mainz, West Germany, 6-11 Sep. 1981 Sponsored by Comitato Nazionale per l'Energia Nucleare (CNEN)
(CISE-1699) Avail: NTIS HC A02/MF A01

Corrosion tests of carbon steel were carried out in a dynamic loop at high temperature and pressure under reducing chemical conditions. These experiments were performed in ammoniated water, with and without oxygen, at temperatures up to 250 C. Corrosion rate was determined by measuring the linear polarization resistance drop in the water. Redox potential of the water and corrosion potential of the steel were also measured. The influence of additions of hydrazine on the same potentials and corrosion rate was determined. Results show that (1) the measurement method is capable of following the change in corrosion rate due to increasing surface passivation and that (2) the most important parameter relevant to corrosion rate at equilibrium is water quality, even in the presence of a reducing agent. Author (ESA)

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-19369 Florida Univ., Gainesville.
THE POLARIZED INFRARED REFLECTION SPECTROSCOPIC CHARACTERIZATION AND AQUEOUS DURABILITY OF LITHIA-DISILICATE GLASS CERAMICS Ph.D. Thesis
Walter John McCracken 1981 132 p
Avail: Univ. Microfilms Order No. 8127450

The structure property environment relationship of glass ceramic materials was investigated in order to study their changes during aqueous corrosion. Polarized infrared reflection spectroscopy (PIRRS) is used to assign atomic vibrational modes to the peaks in reflection spectra of single crystals of quartz, lithia disilicate, and lithia metasilicate. The effect on the PIRRS data of increasing the number of nonbridging oxygens per silica tetrahedra in the silicate structure is demonstrated. By combining the PIRRS data of single crystal lithia disilicate and the PIRRS data of polycrystalline lithia disilicate glass ceramics the glass ceramic surface can be characterized so that changes in the surface structure during aqueous corrosion can be monitored. Aqueous durability of lithia disilicate glass ceramics was studied using four volume fractions of crystallinity and three different pH environments. The crystallization significantly affects the corrosion behavior of the lithia disilicate glass. In general, the least surface damage is observed on all the materials when exposed to acidic solution and the most extensive surface alterations occur on all the materials exposed to the basic solutions. On glass, network dissolution occurs uniformly over the entire exposed surface. On glass ceramics, network dissolution proceeds at different rates over the surface, with the highest rate occurring on the glassy phase. In addition to ion exchange and network dissolution, phase boundary attack between the glass and crystalline phases and intracrystalline attack are important in glass ceramic systems exposed to basic solutions, or to static neutral solutions for long times. Dissert. Abstr.

N82-19370 Florida Univ., Gainesville.
FRACTURE MECHANICS AND FAILURE PREDICTIONS FOR GLASS, GLASS-CERAMIC, CERAMIC SYSTEMS Ph.D. Thesis
Ronald Alan Palmer 1981 170 p
Avail: Univ. Microfilms Order No. 8127457

The fatigue parameters for the lithium disilicate glass/glass-ceramic system were determined, in examining the effects of crystallization on fatigue behavior. Two methods (dynamic fatigue and slow crack growth) were employed and were found to produce different values for the fatigue parameters. It was found that aqueous corrosion has a severe effect on the fatigue parameters, as measured in dynamic fatigue, especially after aging up for up to one week in distilled water. The lithium disilicate glass, which is known to readily form a gel layer in water, exhibits the most rapid change in parameters. The most crystalline composition (92% crystalline) shows the greatest strength loss due to aging. At low volume fraction of crystals (7%) a residual stress in the glassy matrix effects a strength increase and a decrease in the environmental sensitivity which disappears with aging in water. No effect of aging in water was found in the slow crack growth studies. In all cases, the environmental sensitivity was found to be much higher in these experiments than in dynamic fatigue. The limitations of the present fracture mechanics theory are discussed in the light of the inconsistencies found between these methods. A matrix of tests, including static and dynamic fatigue and proof tests, is proposed as an improved method of characterizing the fatigue behavior of a material.
Dissert. Abstr.

N82-19371 North Carolina State Univ. at Raleigh.
THE SYNTHESIS OF BIODEGRADABLE BLOCK COPOLYMERS CONTAINING AMYLOSE AND POLYESTER OLIGOMERIC BLOCKS Ph.D. Thesis
Kiu-Seung Lee 1981 127 p
Avail: Univ. Microfilms Order No. 8121763

Block co- and terpolymers containing amylose and polyester oligomeric blocks were synthesized using a six step reaction scheme. Block co- and terpolymers were readily degraded by alpha amylase, an enzyme present in the human body. Intrinsic viscosity versus time of enzymatic exposure were used to follow the biodegradation of the polymers. The block co- and terpolymers were characterized by a variety of techniques. The chemical properties and physical properties of the polymers were measured. All of the data collected support the formation of biodegradable block copolymers. Dissert. Abstr.

N82-19372 North Carolina State Univ. at Raleigh.
FREE VOLUME THEORY OF DIFFUSION INTO POLYMERS. PART 1: METHOD OF PREDICTING ACTIVATION ENERGIES OF DIFFUSION FOR GASES INTO ELASTO-

MERS. PART 2: DIFFUSION OF NON-IONIC DYES INTO SEMI-CRYSTALLINE POLY (ETHYLENE TEREPHTHALATE) FILMS. PART 3: RELATIONSHIP BETWEEN GLASS-TRANSITION AND DYEING-TRANSITION TEMPERATURES Ph.D. Thesis

Rochana Kosiyanon 1981 192 p

Avail: Univ. Microfilms Order No. 8121737

The validity of Fujita's free volume theory, applied to the diffusion of various penetrants into polymers, was tested. The diffusion of five gasses into nine amorphous polymers is examined. An equation is derived to predict the activation energies of diffusion, the temperature of diffusion, the glass transition temperature of the polymer, and a constant depending on the penetrant. This equation and the theoretical approach on which it is based are shown to be satisfactory for a set of five simple gases, diffusing into a set of nine elastomers. A modified theory is applied to the disperse dyeing of semi-crystalline Poly(ethylene terephthalate) fibers and film. Several systems such as vapor phase dyeing, aqueous and solvent dyeing are examined. The analysis of the data confirms the validity of certain aspects of the proposed, modified free volume theory. The modified theory is extended to describe the transition temperature of dyeing. A mathematical expression is deduced which makes it possible to predict the transition temperature of dyeing in any system which conforms to the basic assumptions inherent in the modified theory. The predictions agree with the experimental data for a two-component, vapor phase dyeing system. Dissert. Abstr.

N82-19373*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TRIBOLOGICAL PROPERTIES AT 25 C OF SEVEN POLYIMIDE FILMS BONDED TO 440 C HIGH-TEMPERATURE STAINLESS STEEL

Robert L. Fusaro Feb. 1982 23 p refs

(NASA-TP-1944; E-758) Avail: NTIS HC A02/MF A01 CSCL 07C

The tribological properties of seven polyimide films applied to 440 C high temperature stainless steel substrates were studied at 25 C with a pin-on-disk type of friction and were apparatus. The polyimides fell into two groups according to friction and wear properties. Group I polyimides had slightly lower friction but much higher wear than group II polyimides. The wear mechanism was predominately adhesion, but the wear particles were larger for group I polyimides. For most of the polyimides the transfer films consisted of clumps of compacted wear particles. One polyimide composition produced a very thin transfer film that sheared plastically in the contact area. Author

N82-19374*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SURFACE CHEMISTRY AND WEAR BEHAVIOR OF SINGLE-CRYSTAL SILICON CARBIDE SLIDING AGAINST IRON AT TEMPERATURES TO 1500 C IN VACUUM

Kazuhisa Miyoshi and Donald H. Buckley Feb. 1982 14 p refs

(NASA-TP-1947; E-654) Avail: NTIS HC A02/MF A01 CSCL 07C

X-ray photoelectron and Auger electron spectroscopy analyses and morphological studies of wear and metal transfer were conducted with a single-crystal silicon carbide 0001 surface in contact with iron at various temperatures to 1500 C in a vacuum of 10 to the minus 8th power pascal. The results indicate that below 800 C, carbide-carbon and silicon are primarily seen on the silicon carbide surface. Above 800 C the graphite increases rapidly with increase in temperature. The outermost surficial layer, which consists mostly of graphite and little silicon at temperatures above 1200 C is about 2 nm thick. A thicker layer, which consists of a mixture of graphite, carbide, and silicon is approximately 100 nm thick. The closer the surface sliding temperature is to 800 C, the more the metal transfer produced. Above 800 C, there was a transfer of rough, discontinuous, and thin iron debris instead of smooth, continuous and thin iron film which was observed to transfer below 800 C. Two kinds of fracture pits were observed on the silicon carbide surface: (1) a pit with a spherical asperity; and (2) multiangular shaped pits. Author

N82-19375# Southwest Research Inst., San Antonio, Tex. Army Fuels and Lubricants Research Lab.

LABORATORY EVALUATION OF MULTIVISCOSITY-GRADE ENGINE OILS IN US ARMY DIESEL ENGINES Interim Report, Nov. 1978 - Jun. 1980

Richard B. Moon and Alan F. Montemayor May 1981 567 p refs

(Contracts DAAK70-78-C-0001; DAAK70-80-C-0001; DA Proj. 1L7-62733-AH-20)

(AD-A108890; AFLRL-112) Avail: NTIS HC A24/MF A01 CSCL 11/8

Seven multigrade engine oils were tested against 10 grade and 30 grade reference oil in the DD 6V-53T engine using a 240-hour tracked-vehicle cyclic endurance test and in the Teledyne Continental LD/LDT-465 engines using a 210-hour wheeled-vehicle cyclic endurance test. The results of these tests are tabulated and compared with results from reference oil tests. Two SAE 15W-40 oils proved equal or better than the reference oil and were recommended for adoption as MIL-L-2104 oils. GRA

N82-19376# Ministry of Defence, London (England). Joint Committee on the Behavior of Plastics Materials under Tropical Conditions.

THE WEATHERING OF PLASTICS MATERIALS IN THE TROPICS. 6: THE FURTHER EVALUATION OF A SOLAR RADIATION CONCENTRATING DEVICE (EMMA) AS A MEANS OF ACCELERATING THE WEATHERING OF PLASTICS

1981 42 p refs Prepared jointly with British Plastics Federation

(AD-A109385; DRIC-BR-80352) Avail: NTIS HC A03/MF A01 CSCL 11/9

This report is an account of a second trial conducted at Desert Sunshine Exposure Test Inc. using the facility of the EMMA and EMMAQUA machines which are reported to accelerate natural weathering. Low density polyethylene and polyacetal specimens were tested and no real acceleration factors could be found for the EMMA machines over natural 45 deg exposure. Author (GRA)

N82-19377# General Electric Co., Schenectady, N. Y. Corporate Research and Development Office.

IMPACT RESPONSE CHARACTERISTICS OF POLYMERIC MATERIALS Final Report, 27 Apr. 1979 - 30 Apr. 1981

William B. Hillig Nov. 1981 98 p refs

(Contract N00019-79-C-0347)

(AD-A109281; SRD-81-081) Avail: NTIS HC A05/MF A01 CSCL 11/9

Studies concerned with determining, understanding, and trying to predict the behavior of polymethylmethacrylate (PMMA) and polycarbonate (PC) under impact are discussed. In the present work the impact velocity was extended to 2.1, 125, and 220 m/s using a 4.5 mm steel ball as the projectile. Because of dispersion effects the pulse detected using an instrumented Hopkinson impact bar was markedly distorted. A new semi-empirical procedure for correcting the pulse was developed. Analysis of the data showed that the deduced Young's modulus of PMMA slowly increases with increasing impact velocity. However, the derived modulus of PC decreases by a fctor of five when the impact velocity was increased from 2.1 to 220 m/s. A theoretically based model was formulated to 'predict' the impact response of the two materials from their elastic modulus, densification properties, and stress relaxation laws. This modified spring/dashpot model allows the response of the polymers to be continuously varied between seties-like and parallel-like. The PMMA was found to require a predominantly series-like mode description, whereas the PC response was more parallel-like. GRA

N82-19378# Stanford Univ., Calif. Dept. of Chemical Engineering.

MORPHOLOGY OF THE POLYSTYRENE/POLY(VINYL METHYL ETHER) BLEND AS STUDIED BY EXCIMER FLUORESCENCE Final Report, 16 Oct. 1978 - 15 Oct. 1981

Curtis W. Frank 14 Dec. 1981 7 p refs

(Contract DAAG29-78-C-0047)

(AD-A109143; ARO-15770.2-C) Avail: NTIS HC A02/MF A01 CSCL 07/3

Excimer fluorescence was used to study conformational

statistics and aggregation in miscible and immiscible blends of polystyrene with poly(vinyl methyl ether). At low polystyrene concentration in miscible blends, excimer fluorescence of isolated polystyrene chains is analyzed in terms of a one dimensional random walk of the migrating singlet exciton. At high concentration in miscible blends the energy migration is three-dimensional. Knowledge of the fluorescence behavior for miscible blends was used to determine the phase composition for phase separated blends. GRA

N82-19379# National Centre of Tribology, Risley (England). European Space Tribology Lab.
MOLYBDENUM DISULPHIDE LUBRICATION. A CONTINUATION SURVEY: 1977/78
A. R. Lansdown and W. R. Burke, ed. Jun. 1981 37 p refs Previously announced as ESA-CR(P)-1330
(ESA-TRIB-4; ESA-CR(P)-1330; ISSN-0250-4448) Avail: NTIS HC A03/MF A01

Aspects of molybdenum disulfide lubrication considered include chemical and physical properties, the lubrication mechanism, its incorporation in bulk solids, its use in oils and greases, and whether it has anticorrosive properties. Although a reduction in molybdenite supply means higher prices for molybdenum-containing materials, the literature indicates that molybdenum disulphide based lubricants are becoming more widely used as multipurpose products for general use following the energy crisis. They reduce fuel and oil consumption in car engines, are wear effective up to 700 F, and are solvent resistant. Author (ESA)

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-19380# Northwestern Univ., Evanston, Ill. Dept. of Physics and Astronomy.
ELECTRONICALLY INDUCED PHASE TRANSFORMATIONS Interim Scientific Report, 1 Oct. 1980 - 30 Sep. 1981
Arthur J. Freeman 30 Nov. 1981 11 p refs
(Grant AF-AFOSR-0024-81; AF Proj. 2301)
(AD-A108982; AFOSR-81-0866TR) Avail: NTIS HC A02/MF A01 CSCL 19/1

The electronic interactions responsible for the observed electronically induced phase transformations in several important classes of materials were investigated theoretically in close collaboration with experimental programs at other institutions. These include the high field superconductivity of Chevrel phase compounds and the first theoretical demonstration that the Jaccarino-Peter mechanism is responsible for the large increase in the upper critical field when large concentrations of Eu magnetic impurities are added to SnMo6S8, an extensive study of the unusual magnetic and superconducting properties of some C15 compounds, self-consistent energy band calculations including all electrons and all atoms in the 16 atoms per unit cell of the linear chain transition metal trichalcogenide, TaSe3, and the first demonstration of the onset of a metamagnetic transition in Pd Metal. Author (GRA)

N82-19381# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
PARAMETRIC STUDY OF PROPELLANT CRACK COMBUSTION Final Report, 1979
Kibong Kim 21 Oct. 1981 37 p refs
(AD-A108769; NSWC/TR-79-485) Avail: NTIS HC A03/MF A01 CSCL 21/9

Selective calculations have been made for burning in cracks as it pertains to solid rocket motor propellants. The possibility of obtaining pressures high enough to cause a shock-to-detonation transition (sdt) in propellant grains is examined. Variables affecting the crack combustion process which were selected for study are: crack shape; location; surface roughness; propellant deformation; ignition criterion; and burning rate. The variables are evaluated and ordered in groups of relative importance. Results suggest that SDT should not occur in propellants unless the granulation of the grain is severe enough to provide large burning surface area. Author (GRA)

N82-19382# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.
HIGH ENERGY PROPELLANTS CONTAINING MAGNESIUM [BRAENSLERIKA KRUT INNEHAALLANDE MAGNESIUM]
Torsten Liljegren Nov. 1981 31 p refs In SWEDISH
(FOA-C-20432-D1) Avail: NTIS HC A03/MF A01

The possibilities for using these propellants in external combustion projectiles or in ramjet engines are studied. Magnesium has a moderate heat of combustion lower than, e.g., boron or aluminum. It has a low ignition temperature and burns in gas phase with a high burning rate. Energy and performance data are given and from these the choice of propellant composition is discussed. Manufacture of hydroxy terminated polybutadiene or HTPB propellants is reported. Results from test firings are given. Author (ESA)

N82-19383# Mathtech, Inc., Princeton, N. J.
IMPEDIMENTS TO ENERGY AND MATERIALS RECOVERY FACILITIES FOR MUNICIPAL SOLID WASTE Final Report
Ernest H. Manuel, Jr. and Fritz W. Efaw Sep. 1981 229 p refs Prepared in cooperation with Franklin Associates, Prairie Village, Kans.
(Contract EPA-68-03-2761)
(PB82-102302; EPA-600/2-81-181) Avail: NTIS HC A11/MF A01 CSCL 21D

The impediments to recycling municipal solid waste were studied. The eight facilities selected for indepth analysis represented a cross section of technologies, ownership types, geographical locations, and recovered products. None of the facilities were economical in the context of providing the least cost mode of disposal, and all eight facilities experienced net operating losses. A major impediment encountered by most of the facilities was competition from lower-cost landfills. GRA

N82-19384# Systems Technology Corp., Xenia, Ohio.
COAL: dRDF (DENSIFIED REFUSE DERIVED FUEL) DEMONSTRATION TEST IN AN INDUSTRIAL SPREADER STOKER BOILER. USE OF COAL: dRDF BLENDS IN STOKER-FIRED BOILERS, VOLUME 1 Final Report
Ned J. Kleinhenz Cincinnati, Ohio EPA Sep. 1981 146 p 2 Vol.
(Contract EPA-68-03-2426)
(PB82-100868; EPA-600/2-81-183-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 21D

Boiler performance and environmental feasibility when combusting densified forms of refuse derived fuels (dRDF) blended with coal and fired in a modern industrial spreader stoker-fired boiler are evaluated. The second phase of a two phase evaluation program is discussed. Phase 2 demonstration testing was conducted in a larger industrial spreader stoker boiler. In a period of 402 hours, 1702 tons of dRDF were co-fired with coal. An additional 231 hours of coal baseline testing was completed to provide a basis of comparison for the test results. GRA

N82-19385# Systems Technology Corp., Xenia, Ohio.
COAL: dRDF (DENSIFIED REFUSE DERIVED FUEL) DEMONSTRATION TEST IN AN INDUSTRIAL SPREADER STOKER BOILER. USE OF COAL: dRDF BLENDS IN STOKER-FIRED BOILERS, APPENDICES A, B, C AND D, VOLUME 2 Final Report
Ned J. Kleinhenz Cincinnati, Ohio EPA Sep. 1981 250 p refs 2 Vol.
(Contract EPA-68-03-2426)
(PB82-100876; EPA-600/2-81-184-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 21D

Boiler performance and environmental feasibility when combusting densified forms of refuse derived fuels (dRDF) blended with coal and fired in a modern industrial spreader stoker-fired boiler are evaluated. Phase 2 demonstration testing was conducted in a large industrial spreader stoker boiler. Site selection criteria, test data tables, formulae, and fuel evaluations are presented GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-19386 Michigan Univ., Ann Arbor.
TIME EFFECTS OF LOW-AMPLITUDE SHEAR MODULUS OF COHESIVE SOILS Ph.D. Thesis
George Andreas Athanasopoulos 1981 300 p
Avail: Univ Microfilms Order No. 8125061

The results of an experimental investigation of time effects on the low-amplitude shear modulus, G sub 0, of artificial and natural cohesive soils are described. The main objectives of the investigation were: (1) evaluation of the effects of drained creep on G sub 0; (2) evaluation of the effects of a temporary total stress release on G sub 0; and (3) correlation of G sub 0 with the undrained shearing strength of cohesive soils. In addition, preliminary studies were performed regarding age-induced overconsolidation and temporary drop of stiffness following the application of the stress increments in a resonant column test.
Dissert. Abstr.

N82-19387*# SRI International Corp., Menlo Park, Calif. Systems Management Div.
MARKET ANALYSIS OF SEISMIC SECURITY SYSTEMS
Steven Taglio Jul. 1981 39 p
(Contract NAS2-10143)
(NASA-CR-168612) Avail: NTIS HC A03/MF A01 CSCL 14B

This report provides information on the commercialization potential of the NASA Activity Monitor. Data on current commercially available products, market size, and growth are combined with information on the NASA technology and the projected impact of this technology on the market. L.F.M.

N82-19388*# Rockwell International Science Center, Thousand Oaks, Calif.
STUDY OF NEAR-THRESHOLD FATIGUE CRACK PROPAGATION IN PIPELINE STEELS IN HIGH PRESSURE ENVIRONMENTS Final Report
M. Mitchell Nov. 1981 133 p refs
(Contract NAS2-10312)
(NASA-CR-166295; SC5230.17FR) Avail: NTIS HC A07/MF A01 CSCL 11F

Near threshold fatigue crack propagation in pipeline steels in high pressure environments was studied. The objective was to determine the level of threshold stress intensity for fatigue crack growth rate behavior in a high strength low alloy X60 pipeline-type steel. Complete results have been generated for gaseous hydrogen at ambient pressure, laboratory air at ambient pressure and approximately 60% relative humidity as well as vacuum of 0.000067 Pa (< 0.0000005 torr) at R-ratios = K(min)/K(max) of 0.1, 0.5, and 0.8. Fatigue crack growth rate behavior in gaseous hydrogen, methane, and methane plus 10 percent hydrogen at 6.89 MPa (100 psi) was determined.
R.J.F.

N82-19389# Technische Hogeschool, Delft (Netherlands).
SYSTEM IDENTIFICATION FOR MULTIVARIABLE CONTROL
Gerrit Adrianus vanZee 6 May 1981 119 p refs
Avail: NTIS HC A06/MF A01

System identification methods and modern control theory are applied to industrial processes. These processes must often be controlled in order to meet certain requirements with respect to the product quality, safety, energy consumption, and environmental load. Modern control system design methods which take the occurring interaction phenomena and stochastic disturbances into account are used. An accurate dynamic mathematical model of the process, by theoretical modelling and/or by system identification is obtained. The computational aspects of two important types of identifications methods, i.e., stochastic realization and prediction error based parameter estimation are studied. The studied computational aspects are the robustness, the accuracy, and the computational costs of the methods. Theoretical analyses and applications to a multivariable pilot scale process, operating under closed loop conditions are investigated.
S.L.

N82-19390*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECT OF VACUUM PROCESSING ON OUTGASSING WITHIN AN ORBITING MOLECULAR SHIELD
R. A. Outlaw Mar. 1982 14 p refs
(NASA-TP-1980; L-14987) Avail: NTIS HC A02/MF A01 CSCL 20H

The limiting hydrogen number density in an orbiting molecular shield is highly dependent on the outgassing rates from the materials of construction for the shield, experimental apparatus, and other hardware contained within the shield. Ordinary degassing temperatures used for ultrahigh vacuum studies (less than 450 C) are not sufficient to process metals so that the contribution to the number density within the shield due to outgassing is less than the theoretically attainable level (approximately 200 per cu. cm). Pure aluminum and type 347 stainless steel were studied as candidate shield materials. Measurements of their hydrogen concentration and diffusion coefficients were made, and the effects of high temperature vacuum processing (greater than 600 C) on their resulting outgassing rates was determined. The densities in a molecular shield due to the outgassing from either metal were substantially less (< 0.003) than the density due to the ambient atomic hydrogen flux at an orbital altitude of 500 km.
S.L.

N82-19391# Naval Ship Research and Development Center, Annapolis, Md. Propulsion and Auxiliary Systems Dept.
FOUNDATIONS FOR COMPUTER SIMULATION OF A LOW PRESSURE OIL FLOODED SINGLE SCREW AIR COMPRESSOR M.S. Thesis - Purdue Univ.
Thomas W. Bein Dec. 1981 122 p refs
(AD-A108230; DTNSRDC/PAS-81/24) Avail: NTIS HC A06/MF A01 CSCL 13/7

The necessary logic to construct a computer model to predict the performance of an oil flooded, single screw air compressor is developed. The geometric variables and relationships used to describe the general single screw mechanism are developed. The governing equations to describe the processes are developed from their primary relationships. The assumptions used in the development are also defined and justified. The computer model predicts the internal pressure, temperature, and flowrates through the leakage paths throughout the compression cycle of the single screw compressor. The model uses empirical external values as the basis for the internal predictions. The computer values are compared to the empirical values, and conclusions are drawn based on the results. Recommendations are made for future efforts to improve the computer model and to verify some of the conclusions that are drawn.
Author (GRA)

N82-19392# New Mexico Univ., Albuquerque. Engineering Research Inst.
ASPHALT RECYCLING TECHNOLOGY: LITERATURE REVIEW AND RESEARCH PLAN Final Report, 30 Sep. 1980 - 15 Apr. 1981
David E. Newcomb and Jon A. Epps Tyndall AFB, Fla. Air Force Engineering and Services Center Jun. 1981 172 p refs
(Contract F29601-76-C-0015; AF Proj. 2104)
(AD-A108199; NMERI-5.16-AP-40; AFESC/ESL-TR-81-42)
Avail: NTIS HC A08/MF A01 CSCL 11/7

A review of current technology for the rehabilitation and maintenance of pavement surfaces by recycling was conducted. While the primary concern was asphalt concrete recycling, a brief review of portland cement concrete recycling is included. Reports of cases involving recycling technology and lessons learned are reviewed. Recommendations are presented outlining research required to advance the state-of-the-art in a manner that will permit the U.S. Air Force to fully attain the benefits of recycling technology.
Author (GRA)

N82-19393# San Diego State Univ., Calif. Dept. of Civil Engineering.
LABORATORY VERIFICATION OF BLAST-INDUCED LIQUEFACTION MECHANISM Final Report, Jan. - Jul. 1981

Richard J. Fragaszy and Michael E. Voss Oct. 1981 59 p refs
(Grant AF-AFOSR-0085-81; AF Proj. 2307)
(AD-A109000; AFOSR-81-0843TR; SDSU-CES-81145) Avail: NTIS HC A04/MF A01 CSCL 08/13

A mechanism for blast-induced liquefaction was tested in a series of high pressure undrained, isotropic compression tests on saturated samples of Eniwetok beach sand and Ottawa sand. Theory, based on inelastic volume compressibility of sand, was shown to be valid for the case of quasi-static, isotropic loading. Specimens of Eniwetok sand subjected to an initial effective stress of 1 MPa were liquefied by a single cycle of loading of 34 MPa. Specimens of Ottawa sand, tested in the same manner, generated excess pore pressure but not enough to completely liquefy the soil. The errors introduced by flexibility of the testing systems were analyzed and found to be insignificant. Suggestions for future research were made. Author (GRA)

N82-19394# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
ABRASION-EROSION RESISTANCE OF FIBER REINFORCED CONCRETE Final Report
Tony C. Liu and James E. McDonald Nov. 1981 31 p refs Presented at the Am. Soc. for Testing and Mater. Symp. on Durability of Concrete, Orlando, Fla., Dec. 1980
(AD-A108988; WES/MP/SL-81-32) Avail: NTIS HC A03/MF A01 CSCL 11/2

The concrete was used for repair of abrasion erosion damaged areas such as stilling basins, conduits, sluiceways, and discharge laterals in hydraulic structures. Thirteen concrete mixtures of three water cement ratios ranging from 0.40 to 0.72, each containing one of four different types of steel fibers, were tested. As is true of concrete without steel fibers, the abrasion erosion resistance of FRC increased with decrease in water cement ratio and consequent increase in compressive strength. The lengths of the fibers had very little effect on the abrasion erosion resistance, and the FRC containing collated and hooked fibers had better abrasion erosion resistance than the comparable concrete containing straight fibers. A comparison of the performance of FRC and concrete not containing fibers clearly showed that FRC was less resistant to abrasion erosion than concrete of the same aggregate type and water cement ratio without fibers. GRA

N82-19395# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.
PRECAST CONCRETE PAVEMENTS Final Report, Nov. 1978 - Sep. 1980
Raymond S. Rollings and Yu. T. Chou Nov. 1981 66 p refs (DA Proj. 4A1-61102-AT-22)
(AD-A108802; WES/MP/GL-81-10) Avail: NTIS HC A04/MF A01 CSCL 13/13

This report reviewed published literature on precast concrete pavements and found that precast concrete pavements have had some limited application in airfields, roads, and storage areas. This review of past experience and an analytical study of precast slabs concluded that existing design and construction techniques can be adapted for use with precast concrete pavements, but more work is needed to develop effective and easily constructed load transfer designs for slab joints. Precast concrete does not offer any advantage for conventional pavements due to its high cost and surface roughness, but it may find applications for special problems such as construction in adverse weather, subgrade settlement, temporary pavements that need to be relocated, and military operations. Author (GRA)

N82-19396# Engineering Dynamics International, St. Louis, Mo.
AIRPORT RELATED RESIDENTIAL ACOUSTICAL INSULATION DEMONSTRATION PROJECT: REPORT 1720 Final Report
J. T. Weissenburger, J. C. McBryan, and L. F. Heitkamo Jun. 1981 107 p refs Sponsored by St. Louis Airport Authority, Mo.
(PB82-100777) Avail: NTIS HC A06/MF A01 CSCL 13B

A demonstration project to evaluate the feasibility of retrofit acoustical insulation in single family residences as a possible remedial measure for homes impacted by airport and aircraft noise is described. Six private residences generally located in an area to the east and southeast of Lambert St. Louis International Airport were used. The program involved making before and after noise measurements, selecting contractors, and overseeing the installation of selected acoustical controls, and evaluating the effectiveness of the program. A description of each individual house and measured data pertaining to the house is presented. GRA

N82-19397# Purdue Univ., Lafayette, Ind. School of Industrial Engineering.
THE OPTIMAL PLANNING OF COMPUTERIZED MANUFACTURING SYSTEMS
Kathryn E. Stecke, J. J. Solberg, and Moshe M. Barash Feb. 1981 323 p refs
(Grant NSF APR-74-15256)
(PB82-110644; NSF/MEA-81010; Rept-20) Avail: NTIS HC A14/MF A01 CSCL 13H

Grouping and loading problems associated with flexible manufacturing systems (FMS) are addressed. The solution to the grouping problem is to organize the machines so that each machine in a particular group is able to perform the same operations. The loading problem is to allocate the operations and associated tools of a set of selected part types among the machine groups, subject to the technological and capacity constraints of FMS. A closed network of queues (CNC) model is used. The expected production rate is defined as a function of the number of parts in the system, the number and sizes of machine groups, and the workload assigned to each group. Alternative loading objectives are defined in addition to the balancing and unbalancing objective examined. Nonlinear mixed integer for mutations of the loading problem are developed.GRA

N82-19398# Bureau of Reclamation, Boulder City, Nev.
WATER ASSESSMENT FOR THE LOWER COLORADO RIVER REGION-EMERGING ENERGY TECHNOLOGY DEVELOPMENT
Aug. 1981 170 p Sponsored in part by Water Resources Council
(PB82-110107) Avail: NTIS HC A08/MF A01 CSCL 13B

Water supply availability for two hypothetical levels of emerging energy technology development are assessed. The water and related land resources implications of such hypothetical developments are evaluated. Water requirement, the effects on water quality, costs of water supplies, costs of disposal of wastewaters, and the environmental, economic and social impacts are determined, providing information for the development of non-nuclear energy research. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

N82-19399 British Broadcasting Corp., Kingswood (England). Engineering Div.
IMPROVEMENTS TO SPEECH QUALITY FROM A DIVING HELMET
D. J. Meares Dec. 1981 9 p refs
(BBC-RD-1981/9) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

The normal quality of speech received from a microphone in a diving helmet is far from acceptable for broadcasting. It is both severely distorted in terms of spectral content and, where air is supplied to the diver via a 'demand valve', the noise level from the demand valve is extremely high. These problems are examined and ways in which they can be overcome without losing the verisimilitude of the event are suggested. Author

N82-19400 British Broadcasting Corp., Kingswood (England). Engineering Div.
DIGITAL AUDIO. RECURSIVE DIGITAL FILTERING FOR HIGH QUALITY AUDIO SIGNALS
G. W. McNally and C. Eng Dec. 1981 32 p refs
(BBC-RD-1981/10) Avail: BBC, Kingswood Warren, Tadworth,

Surrey, England

A high speed, low cost digital signal processor was designed and built suitable for real-time operations on high quality sound signals. The purpose of the work described here is to examine its application to audio filters of a kind currently found in equipment such as mixing desks. The methods by which digital audio filters may be designed are reviewed and a detailed study is presented of the many ways in which the design may be realized and implemented. The Report describes two structures in detail which were identified as providing high performance with ease of implementation. The effects of coefficient quantization and round-off noise are quantified by computer simulation of the hardware structure; and by these means, a specification for the required world-length is determined. An example is given of a four filter cascade for audio equalization with a suitable implementation in programmable hardware. The filters are controlled by flexible commands issued on an internationally standarized communications bus. Author

N82-19401 Aeronautical Research Labs., Melbourne (Australia).
GROUND STATION DIGITAL INTERFACE
K. F. Fraser and U. R. Krieser Sep. 1980 66 p refs
(ARL/MECH-ENG-Rept-158) Copyright. Avail: Issuing Activity

Digital computer interface equipment was developed to enable the recovery of digital data encoded in special format and recorded, both in flight and in laboratory experiments, using an analog magnetic tape transport. The recorded data were first reproduced, in a continuous manner, at a ground station processing center, using an analogue magnetic tape reproducing machine and was then taken to the input of the interface equipment. Serial to parallel conversion of the data into 16-bit words suitable for direct entry into a computer, under interrupt control, was performed by the interface equipment. Time-of-day information which is normaly multiplexed with other digital data and recorded on the magnetic tape, effectively constitutes an identifier which may be used for specifying the location of any areas of interest on the tape. To enable the analog reproducing machine to be stopped at any predetermined location, a present stop signal generator was incorporated in the interface equipment. Complete details, together with a functional description, of each circuit within the digital interface equipment are included. Author

N82-19402 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
COMPARATIVE STUDIES OF CORRELATION TECHNIQUES IN THE SIDELOBE CANCELLER IN THE PRESENCE OF PULSE-TYPE JAMMING SIGNALS
E. Egner and D. Baumgarten Apr. 1981 35 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-RuS-1/80; BMVg-T/RF-31/71435/71340)
(Rept-3/81; Lfd-187) Copyright. Avail: Issuing Activity

A digitally implemented sidelobe canceller is proposed in replacement of the sidelobe blanker usually used for suppressing pulse type jamming signals which may otherwise reduce the sidelobe cancellation performance of radar array processing against interference significantly. The signal processing methods in the control loop correlator are reviewed and a concept for a digitally implemented canceller is derived. Its filter weight vector is computed by a linear inhomogeneous differential equation with periodic coefficients, the solution of which is found by reduction to a linear difference equation with constant coefficients. The theory is supported by results of an analog computer simulation and by a bench test of a digital adaptive spatial filter. The latter results indicate that integration correlation is superior to low pass correlation in suppressing jamming signals. Author (ESA)

N82-19403 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
MEASUREMENTS OF AZIMUTH AND DISTANCE USING ARBITRARY CONFIGURATIONS OF SENSORS WITH UNKNOWN COORDINATES IN TWO DIMENSIONS
W. Brandenburg Jul. 1981 33 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-SuK-2.4/80; BMVg-GF-5/81)
(Rept-7/81; Lfd-191) Copyright. Avail: Issuing Activity

In two dimensional space, a unique solution can be found for the determination of the azimuth and distance of unknown sources by means of the measurement of time delays from an arbitrary configuration of sensors whose exact coordinates are unknown. A typical example is the deployment of sonobuoys. Significant simplification is obtained when the sensor-source distance is infinite. For the case of finite distance, an iterative procedure is required, using as initial conditions the distances of the different sensors with respect to a reference sensor, but not their relative directions or relative distances. The accuracy is better the closer the sources are with respect to the reference sensor. Iterative methods are also presented for identifying the deformation of an antenna, using narrowband processes. Author (ESA)

N82-19404 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
DETERMINATION OF THE VELOCITY AND THE DISTANCE OF A MOVING CW SOURCE BY EXPLOITING THE DOPPLER EFFECT ON THE REVERBERATION SIGNAL
J. Ziegenbein Jun. 1981 30 p refs In GERMAN; ENGLISH summary
(Contracts BMVg-GF-80; BMVg-SuK-2)
(Rept-6/81; Lfd-190) Copyright. Avail: Issuing Activity

A ship intercept analysis method is proposed. The Doppler frequency spread of the reverberation signals received in a bistatic sonar configuration are analyzed in order to determine the ship velocity vector and distance. The principle of the method is explained and the accuracy is estimated. A priori knowledge of the source frequency is not required. A stationary and a moving receiver are considered. In the latter case, the velocity vector of the receiver should be known accurately. Sea experiments are not available. Author (ESA)

N82-19405 Forschungsinstitut fuer Hochfrequenzphysik, Werthhoven (West Germany).
COMPARISON OF SUBJECTIVE AND AUTOMATIC PROCEDURES FOR ESTIMATING APPARENT TARGET LENGTH FROM ECHO DURATION
F. Dommermuth Sep. 1981 12 p refs In GERMAN; ENGLISH summary Supplement to FHP-6-79
(Contract BMVg-T/RF-37/71501/71300)
(Rept-8/81; Lfd-192; FHP-6-79) Copyright. Avail: Issuing Activity

The capabilities of human operators and of automatic procedures in estimating the length of targets detected by such localization systems as sonar or radar are compared. The measurement of the apparent, i.e., radially projected, length is achieved by using signals with sufficient bandwidth to resolve the reflecting target into several resolution cells. One hundred echo examples were presented to nine test operators and likewise processed automatically by means of a maximum likelihood procedure. Statistical testing shows that the performance of the individual human operators is worse than that of the automatic procedure. The average performance of the operators on the contrary compares well with more objective procedure. Author (ESA)

N82-19406*# Rice Univ., Houston, Tex.
PHASE PERTURBATION MEASUREMENTS THROUGH A HEATED IONOSPHERE Final Report
A. Frey and W. E. Gordon Feb. 1982 36 p refs
(Contract NAS9-16428)
(NASA-CR-167550) Avail: NTIS HC A03/MF A01 CSCL 20N

High frequency radiowaves incident on an overdense (i.e., HF-frequency < penetration frequency) ionosphere produce electron density irregularities. The effect of such ionospheric irregularities on the phase of UHF-radiowaves was determined. For that purpose the phase of radiowaves originating from celestial radio sources was observed with two antennas. The radiosources were chosen such that the line of sight to at least one of the antennas (usually both) passed through the modified volume of the ionosphere. Observations at 430 MHz and at 2380 MHz indicate that natural irregularities have a much stronger effect on the UHF phase fluctuations than the HF-induced irregularities for presently achieved HF-power densities of 20-80 uW/sq m. It is not clear whether some of the effects observed are the result of HF-modification of the ionosphere. Upper limits on the

phase perturbations produced by HF-modification are 10 deg at 2380 MHz and 80 deg at 430 MHz. A.R.H.

N82-19407*# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
SAR CALIBRATION TECHNOLOGY REVIEW Final Report
J. L. Walker and R. W. Larson Aug. 1981 161 p refs
(Contract NAS9-16135)
(NASA-CR-167534; Rept-150400-7-F) Avail: NTIS HC A08/MF A01 CSCL 17I

Synthetic Aperture Radar (SAR) calibration technology including a general description of the primary calibration techniques and some of the factors which affect the performance of calibrated SAR systems are reviewed. The use of reference reflectors for measurement of the total system transfer function along with an on-board calibration signal generator for monitoring the temporal variations of the receiver to processor output is a practical approach for SAR calibration. However, preliminary error analysis and previous experimental measurements indicate that reflectivity measurement accuracies of better than 3 dB will be difficult to achieve. This is not adequate for many applications and, therefore, improved end-to-end SAR calibration techniques are required. R.J.F.

N82-19408*# Texas Univ. at Arlington. Applied Research Labs.
MATHEMATICAL MODELING AND SAR SIMULATION MULTIFUNCTION SAR TECHNOLOGY EFFORTS Final Report, 1 Aug. 1980 - 31 Jul. 1981
Carroll R. Griffin and James M. Estes 10 Sep. 1981 60 p refs
(Contract NAS9-16171)
(NASA-CR-167535; ARL-TR-81-41) Avail: NTIS HC A04/MF A01 CSCL 17I

The orbital SAR (synthetic aperture radar) simulation data was used in several simulation efforts directed toward advanced SAR development. Efforts toward simulating an operational radar, simulation of antenna polarization effects, and simulation of SAR images at serveral different wavelengths are discussed. Avenues for improvements in the orbital SAR simulation and its application to the development of advanced digital radar data processing schemes are indicated. B.W.

N82-19409*# Texas A&M Univ., College Station. Remote Sensing Center.
DEVELOPMENT OF A SYNTHETIC APERTURE RADAR DESIGN APPROACH FOR WIDE-SWATH IMPLEMENTATION Final Report
B. R. Jean Sep. 1981 35 p refs
(Contract NAS9-16102)
(NASA-CR-167536; RSC-4272) Avail: NTIS HC A03/MF A01 CSCL 17I

The first phase of a study program to develop an advanced synthetic aperture radar design concept is presented. Attributes of particular importance for the system design include wide swath coverage, reduced power requirements, and versatility in the selection of frequency, polarization and incident angle. The multiple beam configuration provides imaging at a nearly constant angle of incidence and offers the potential of realizing a wide range of the attributes desired for an orbital imaging radar for Earth resources applications. L.F.M.

N82-19410*# SRI International Corp., Menlo Park, Calif.
COMPRESSED TELEVISION TRANSMISSION: A MARKET SURVEY
Ruth M. Lizak and Laird Q. Cagan Oct. 1981 58 p refs
(Contract NAS2-10143)
(NASA-CR-168614) Avail: NTIS HC A04/MF A01 CSCL 17B

NASA's compressed television transmission technology is described, and its potential market is considered; a market that encompasses teleconferencing, remote medical diagnosis, patient monitoring, transit station surveillance, as well as traffic management and control. In addition, current and potential television transmission systems and their costs and potential manufacturers are considered. L.F.M.

N82-19411# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE AVAILABILITY OF SATELLITE TELECOMMUNICATION LINKS SUBJECT TO ATTENUATION BY RAIN
Janio Kono and Aydano Barreto Carleial Oct. 1981 45 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2239-PRE/025) Avail: NTIS HC A03/MF A01

A model for satellite telecommunication links subject to attenuation by rain is presented. Parameterized equations describe the joint probability density of the attenuations in the Earth-to-space and space-to-Earth paths. The correlation coefficient between the two marginal densities is a free parameter. Link availability is calculated by numerical integration of the joint density over the region of the plane that corresponds to satisfactory communications. The method is applied to the case of a network of low-capacity Earth stations that communicate through a satellite using frequency-division multiple access with a single channel per carrier (SCPC); and to a link where the entire bandwidth of the satellite transponder is occupied by a single carrier. The results show that the value of the correlation coefficient may be important in link design. M.D.K.

N82-19412# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
QPSK DEMODULATOR
Jose Antonio Rodrigues and Aydano Barreto Carleial Jul. 1981 28 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2164-RPE/382) Avail: NTIS HC A03/MF A01

A description of the quaternary phase shift keying modulated signal and of its spectral characteristics is presented. A closed loop demodulator structure is presented, obtained from some practical approximations from the ideal structure. The problem of phase ambiguities is discussed and a technique to solve it is described. R.J.F.

N82-19413# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
2 Nov. 1981 30 p refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 p 28-46
(AD-A108204; FTD-ID(RS)T-0993-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

Direct and reverse interconnection in an infinte emitter array are considered. For individual titles, see N82-19414 through N82-19415.

N82-19414# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
COMPENSATION FOR DIRECT AND REVERSE INTERCONNECTION IN AN INFINITE EMITTER ARRAY
L. V. Ryzhkova *In its* Antenna (Selected Articles), No. 8, 1970 (FTD-ID(RS)T-0993-81) 2 Nov. 1981 p 1-15 refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 (For primary document see N82-19413 10-32)
Avail: NTIS HC A03/MF A01 CSCL 20/14

An infinite emitter array is presented in the form of a multiterminal network whose input connectors coincide with the inputs of actual emitters and whose output connectors coincide with the outputs of individual emitters. This permits expressing all elements of the emitter array scatter matrix by the coupling coefficient between the input connectors. The possibility of compensation for the leakage of energy from one of the channels to the inputs of other channels and the reradiation, by the apertures, of the energy which has landed on them from other apertures is studied. Author

N82-19415# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SIMULTANEOUS COMPENSATION OF DIRECT AND REVERSE INTERCONNECTION IN AN INFINITE EMITTER ARRAY
L. V. Ryzhkova *In its* Antenna (Selected Articles), no. 18, 1970 (FTD-ID(RS)T-0993-81 2 Nov. 1981 p 16-25 refs Transl. into ENGLISH from Antenny (USSR), no. 8, 1970 (For primary document see N82-19413 10-32)

Avail: NTIS HC A03/MF A01 CSCL 20/14

A method is proposed for the calculation of a scheme to compensate for the interconnection of emitters of a plane array in the form of a system of openings which connect the feeding waveguide of all emitters of the array with each other. The simultaneous compensation for the leakage of energy from one of the channels to the inputs of other channels (reverse interconnection) and the reradiation by apertures of the energy which landed on them from other apertures (direct interconnection), it is shown, is possible in a two dimensional array. Author

N82-19416# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ANTENNA (SELECTED ARTICLES)

6 Nov. 1981 32 p refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 p 3-26

(AD-A108175; FTD-ID(RS)T-1134-81) Avail: NTIS HC A03/MF A01 CSCL 20/14

Coordination of linear phased array of waveguide radiators with wide-angle scanning in the E plane is discussed. The radiation characteristics of highly directional arc antennas are calculated. For individual titles, see N82-19417 through N82-19418.

N82-19417# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COORDINATION OF A LINEAR PHASE ARRAY OF WAVEGUIDE RADIATORS WITH WIDE-ANGLE SCANNING IN THE E PLANE

O. G. Vendik and L. V. Rizhkova *In its* Antenna (Selected Articles), no. 10, 1971 (FTD-ID(RS)T-1134-81) 6 Nov. 1981 p 1-10 refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 (For primary document see N82-19416 10-32)

Avail: NTIS HC A03/MF A01 CSCL 20/14

A linear antenna array of waveguide radiators which permits the compensation of the variation in the reflection coefficient at the input of the system in the scanning sector is examined. The parameters of the system were determined. The calculation carried out for the dependence of the reflection coefficient at the input on the scanning angle shows that the compensation improves the coordination significantly in a wide scan sector. Author

N82-19418# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

CALCULATION OF THE RADIATION CHARACTERISTICS OF HIGHLY DIRECTIONAL ARC ANTENNAS

A. A. Kuzmin *In its* Antenna (Selected Articles), no. 10, 1971 (FTD-ID(RS)T-1134-81) 6 Nov. 1981 p 11-27 refs Transl. into ENGLISH from Antenny (USSR), no. 10, 1971 (For primary document see N82-19416 10-32)

Avail: NTIS HC A03/MF A01 CSCL 20/14

The radiation patterns of a high-directional arc-antenna array are examined. Simple relations were obtained for calculating the width of the main beam, position, and size of the aperture side lobes with isotropic radiators, which are excited uniformly. Author

N82-19419# Radio Technical Commission for Aeronautics, Washington, D. C.

FM BROADCAST INTERFERENCE RELATED TO AIRBORNE ILS, VOR AND VHF COMMUNICATIONS

18 Nov. 1981 96 p refs

(RTCA/DO-176; RTCA/SC-141) Avail: NTIS HC A05/MF A01

Recommendations for controlling the problem of FM broadcast interference with airborne communications are given. For individual titles, see N82-19420 through N82-19423.

N82-19420# Radio Technical Commission for Aeronautics, Washington, D. C.

INVESTIGATION OF TECHNICAL REQUIREMENTS

In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 7-8 (For primary document see N82-19419 10-32)

Avail: NTIS HC A05/MF A01

Tolerances and standards applicable to FM broadcast stations are given, and minimum performance standards for airborne receiving equipment are identified. Performance standards for ILS localizer receiving equipment, for VOR receiving equipment operating at 108-118 MHz, and for radio communication receiving equipment operating at 117.975-136.000 MHz are considered. J.D.H.

N82-19421# Radio Technical Commission for Aeronautics, Washington, D. C.

INVESTIGATION OF AIRBORNE VHF COMMUNICATION AND NAVIGATION EQUIPMENT

In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 9-22 ref (For primary document see N82-19419 10-32)

Avail: NTIS HC A05/MF A01

The Federal Aviation Administration test program investigating the problem of FM broadcast interference is described. The communication signal level to be protected, receiver minimum performance standards, antenna characteristics, and receiver interference tests are described for airborne VHF communications and for ILS and VOR navigation equipment. J.D.H.

N82-19422# Radio Technical Commission for Aeronautics, Washington, D. C.

INVESTIGATION OF THE EFFECTS OF AIRBORNE INSTALLATION FACTORS ON RECEIVER INTERFERENCE

In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 23-52 (For primary document see N82-19419 10-32)

Avail: NTIS HC A05/MF A01

Significant variables which may have an impact on protection criteria are discussed. A rationale for developing voltage limits at a VHF receiver input is presented. A system model consisting of an antenna, transmission line and receiver is developed to define system equations. Distance criteria using model and 100 kW ERP FM broadcast propagation data is developed for various transmission line lengths. J.D.H.

N82-19423# Radio Technical Commission for Aeronautics, Washington, D. C.

FAA/FCC COORDINATION PROCEDURES FOR FM BROADCAST STATIONS

In its FM Broadcast Interference Related to Airborne ILS, VOR and VHF Commun. 18 Nov. 1981 p 53-60 (For primary document see N82-19419 10-32)

Avail: NTIS HC A05/MF A01

Procedures for coordination between the Federal Aviation Administration and the Federal Communications Commission are given and their effectiveness evaluated. Recommendations for strengthening the present informal coordination procedures are presented. J.D.H.

N82-19424# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DESIGN FOR THE INSTALLATION OF A SYSTEM OF ANTENNAS FOR STRATOSPHERIC BALLOON MOBILE TRACKING STATIONS [PROJECTO DE INSTALACAO DE UM SISTEMA DE ANTENAS PARA ESTACAO MOVEL DE RASTREAMENTO DE BALAO ESTRATOSFERICO]

Satoshi Koshima Jan. 1982 59 p refs In PORTUGUESE; ENGLISH summary

(INPE-2306-PRE/073) Avail: NTIS HC A04/MF A01

The design and development of a VHF-UHF antenna system for telemetry and telecommand for INPE mobile tracking stations is discussed. A bihelical antenna working simultaneously as a 460 MHz transmitting antenna and a 240 MHz receiving antenna and a 126.8 MHz optimized four element Yagi antenna are described. Operating characteristics of a protoype 240 MHz helical filter are described. Author

N82-19425# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

STUDY OF THE AVAILABILITY OF SATELLITE TELECOMMUNICATION NETWORKS SUBJECT TO RAIN ATTENUATION M.S. Thesis [ESTUDO DA DISPONIBILIDADE DE ENLACES DE TELECOMUNICACOE POR SATELITES SUJEITOS A ATENUACAO POR CHUVAS]

Janio Kono Jan. 1982 73 p refs In PORTUGUESE; ENGLISH summary

(INPE-2300-TDL/071) Avail: NTIS HC A04/MF A01

A model for satellite telecommunication links subject to

attenuation by rain is presented. The model has parameterized equations describing the joint probability density of the attenuations in the Earth-to-space and space-to-Earth paths. The correlation coefficient between the two marginal densities is a free parameter. Link availability is calculated by numerical integration of the joint density over the region of the plane that corresponds to satisfactory communications. The method is applied to the case of a network of low capacity Earth stations that communicate through a satellite using frequency division multiple access with a single channel per carrier (SCPC), and to the case of a link where the entire bandwidth of the satellite transponder is occupied by a single carrier. The results show that the value of the correlation coefficient may be important in link design. For an SCPC system of 14/12 GHz a difference of approximately 2 dB was found between minimum values of available carrier-to-noise ratios for 99.8% of the time when the correlation coefficient was varied between 0 and 1. J.D.H.

N82-19426# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.
ANIK-B PROGRAM DELIVERY PILOT PROJECT. A 12 MONTH PERFORMANCE ASSESSMENT
I. Bischof, J. W. B. Day, R. W. Huck, W. T. Kerr, and N. G. Davies Dec. 1981 124 p refs
(CRC-1349) Avail: NTIS HC A06/MF A01

An assessment of the Program Delivery Pilot Project (PDPP), one of the most significant projects of the ANIK-B Communications Program of the Department of Communications (DOC) is provided. This project is a field trial involving the reception of television signals at 12 GHz from the 20 watt RF channels of the ANIK-B using low cost TV receive-only earth terminals with antenna diameters of 1.2 and 1.8m. The PDPP has been in operation since late September 1979 with approximately 80 receive-only terminals located in the two geographically distinct regions of northwestern Ontario and British Columbia, the Yukon and Northwest Territories. The objectives of the project are to demonstrate, evaluate and gain field experience with direct-to-home and small community satellite broadcasting, to provide a testing ground and small initial market for terminals, to contribute to policy development and plans for future operational use of broadcasting satellites and to provide information to the various interested agencies. Author

N82-19427# Communications Research Centre, Ottawa (Ontario). Information Technology and Systems Branch.
A METHOD OF MEASURING AND RECORDING. THE IMPULSE RESPONSE OF THE IONOSPHERIC CHANNEL
S. M. Chow Jan. 1982 13 p refs
(CRC-1352) Avail: NTIS HC A02/MF A01

A simple method by which the propagation modes of an ionospheric communication channels can be measured and recorded is described. Experimental results are included as illustration of the technique. Author

N82-19428*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FRESNEL-REGION FIELDS AND ANTENNA NOISE-TEMPERATURE CALCULATIONS FOR ADVANCED MICROWAVE SOUNDING UNITS
R. F. Schmidt Jan. 1982 42 p refs
(NASA-TM-83813) Avail: NTIS HC A03/MF A01 CSCL 20N

A transition from the antenna noise temperature formulation for extended noise sources in the far-field or Fraunhofer-region of an antenna to one of the intermediate near field or Fresnel-region is discussed. The effort is directed toward microwave antenna simulations and high-speed digital computer analysis of radiometric sounding units used to obtain water vapor and temperature profiles of the atmosphere. Fresnel-region fields are compared at various distances from the aperture. The antenna noise temperature contribution of an annular noise source is computed in the Fresnel-region (D squared/16 lambda) for a 13.2 cm diameter offset-paraboloid aperture at 60 GHz. The time-average Poynting vector is used to effect the computation. B.W.

N82-19429# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MULTI-DIMENSIONAL SIGNAL-PROCESSING RESEARCH PROGRAM Semiannual Technical Summary, 1 Oct. 1980 - 31 Mar. 1981
Dan E. Dudgeon 31 Mar. 1981 53 p refs
(Contract F19628-80-C-0002; AF Proj. 4594)
(AD-A108641; ESD-TR-81-94) Avail: NTIS HC A04/MF A01 CSCL 09/2

In the area of image segmentation and classification, a hierarchical segmentation scheme was developed for processing images with several region classes. Adaptive contrast enhancement was used as a preprocessor for image segmentation based on texture rather than gray level. These techniques were also applied to aerial images degraded by light cloud cover and haze. The primary effects of this type of degradation are a reduction in contrast and an increase in the local average intensity of the image. Two aspects of the iterative implementation of multi-dimensional digital filters are also discussed. This first concerns spatial truncation effects which occur during the iteration because the image frame buffer has a finite storage capability. The errors caused by this truncation are closely related to the solution of a boundary value problem with boundary conditions specified on the frame edges. These errors can be eliminated by including the boundary conditions in the spatially truncated iteration. Potential multiprocessor architectures are discussed. GRA

N82-19430# Ohio State Univ., Columbus. Electroscience Lab.
SOPHISTICATED JAMMERS AND ADAPTIVE ARRAYS Quarterly Report
R. T. Compton, Jr. Sep. 1981 8 p ref
(Contract N00019-81-C-0093)
(AD-A109300; ESL-713603-3) Avail: NTIS HC A02/MF A01 CSCL 17/4

This report describes progress under Naval Air Systems Command Contract N00019-81-C-0093 for the second quarterly period. This contract involves studies on the effectiveness of two types of jamming against adaptive arrays: envelope modulated jammers and cross-polarized jammers. Our progress during the second quarter in these areas is described. GRA

N82-19431# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.
THE RESPONSE OF A TWO-WIRE TRANSMISSION LINE TO INCIDENT FIELD AND VOLTAGE EXCITATION, INCLUDING THE EFFECTS OF HIGHER ORDER MODES Phase Report, 1 Oct. 1979 - 30 Sep. 1980
Yehuda Leviatan and Arlon T. Adams Griffiss AFB, N.Y. RADC Aug. 1981 88 p refs
(Contract F30602-79-C-0011; AF Proj. 2338)
(AD-A108780; RADC-TR-81-214) Avail: NTIS HC A05/MF A01 CSCL 09/5

The main objective of this report has been to derive the induced current on a two-wire transmission line due to incident field excitation. Special attention has been paid to the case of voltage source excitation, where the current may be given, at least approximately, using the so-called leaky-wave concept. The influence of the electrical dimensions of the structure on the currents and the relative importance of the higher modes is examined by numerical examples. Author (GRA)

N82-19432# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
SATNET DEVELOPMENT AND OPERATION. PLURIBUS SATELLITE IMP DEVELOPMENT. REMOTE SITE MAINTENANCE. INTERNET OPERATIONS AND MAINTENANCE. MOBILE ACCESS TERMINAL NETWORK. TCP FOR THE HP3000. TCP-TAC. TCP FOR VAX-UNIX. COMBINED QUARTERLY TECHNICAL REPORT Report, 1 Aug. - 31 Oct. 1981
R. D. Bressler Nov. 1981 83 p
(Contracts MDA903-80-C-0353; MDA903-80-C-0214;
N00039-78-C-0405; N00039-80-C-0664;
N00039-81-C-0408; DAHC15-69-C-01759;
F08606-73-C-0027; F08606-75-C-0032;
MDA903-76-C-0214; MDA903-76-C-0252; et al)
(AD-A108783; BBN-4825; QTR-23) Avail: NTIS HC A05/MF A01 CSCL 17/2

This quarterly technical report describes work on the development of and experimentation with packet broadcast by satellite; on development of Pluribus Satellite IMPs; on a study

of the technology of Remote Site Maintenance; on Internetwork monitoring; on shipboard satellite communications; and on the development of Transmission Control Protocols for the HP3000, TAC, and VAX-UNIX. Author (GRA)

N82-19433# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.

AN ASCII FORTRAN SUBROUTINE FOR COMPUTING THE ELECTROMAGNETIC RADIATION SCATTERED BY A SPHERE Technical Report, period ending May 1980

Merrill E. Milham Nov. 1981 43 p refs

(DA Proj. 1L1-62662-A-554)

(AD-A108772; ARCSL-TR-81088) Avail: NTIS HC A03/MF A01 CSCL 20/6

This report describes the ASCMIE subroutine for performing Mie scattering calculations by means of the downward recursion algorithm developed by J. V. Dave. ASCMIE is written in UNIVAC 1100 series ASCII FORTRAN language. The ASCII FORTRAN compiler is a modern, state-of-the-art compiler which implements the ANSI FORTRAN 77 standard; this compiler is intended as a future replacement for the UNIVAC 1100 series FORTRAN V compiler. Rather than carry out a straightforward conversion of the FORTRAN V Mie scattering routine to ASCII FORTRAN, the code was completely rewritten in order to incorporate new ASCII FORTRAN language elements. The result is a more structured, modular, Mie scattering code which executes faster than the FORTRAN V code. Author (GRA)

N82-19434# Naval Research Lab., Washington, D. C. Information Technology Div.

VLFACM PROGRAM DESCRIPTION AND OPERATIONAL MANUAL Final Report

J. P. Hauser, F. J. Rhoads, and Francis J. Kelly 24 Nov. 1981 59 p refs

(AD-A109003; NRL-8530) Avail: NTIS HC A04/MF A01 CSCL 17/2

VLFACM is a FORTRAN computer program which can compute signal or noise-field strengths and signal-to-noise, signal-to-jam, or signal-to-jam-plus-noise ratios in the 14- to 3-kHz frequency range. Additional postprocessing programs exist which can plot VLFACM results in the form of rectangular or polar contour maps, field strength versus distance plots, or diurnal plots. Author (GRA)

N82-19435# Washington Univ., Seattle. Polar Science Center.

SEA ICE MOVEMENTS FROM SYNTHETIC APERTURE RADAR Final Report, 1 Apr. 1979 - 30 Jun. 1981

David A. Rothrock and Alan S. Thorndike 1 Dec. 1981 84 p refs

(Contract N00014-79-C-0418; NR Proj. 307-428)

(AD-A109002) Avail: NTIS HC A05/MF A01 CSCL 08/12

The spatial structure of the sea ice velocity field determines ridging, open water production and ice stress. The velocity has been measured roughly every 2 km along an 865 km track from SEASAT synthetic aperture radar. The movement shows individual pieces as large as 100 km. The spatial autocorrelation function of velocity has been estimated from these data and FGGE and AIDJEX buoy data, and has a length scale of roughly 1000 km. A model of the movement of a set of pieces shows the large uncertainty in opening and ridging estimated from velocities measured at only three points. Author (GRA)

N82-19436# Worcester Polytechnic Inst., Mass. Dept. of Electrical Engineering.

COMPUTER MODELS FOR CONDUCTING SURFACES Final Technical Report, Sep. 1979 - Sep. 1980

Jitendra Singh Griffiss AFB, N.Y. RADC Aug. 1981 170 p refs

(Contract F30602-79-C-0091; AF Proj. 2338)

(AD-A108763; RADC-TR-81-222) Avail: NTIS HC A08/MF A01 CSCL 09/5

Under this effort work has been done to derive and use closed form expressions for generalized impedance parameters involving rectangular, conducting patches in free space. A Galerkin model for the interaction between two wires, a wire and a patch and two patches has been developed. Basis functions sinusoidal in the direction of the current and triangular in the transverse direction have been used. Farrar's Integration technique has been used so as to give most of the results of the model in closed form. Author (GRA)

N82-19437# Harvard Univ., Cambridge, Mass. Computation Lab.

UNBOUNDED SPEED VARIABILITY IN DISTRIBUTED COMMUNICATIONS SYSTEMS

John H. Reif and Paul G. Spirakis 1981 19 p refs

(Contract N00014-80-C-0647; Grant NSF MCS-79-21024)

(AD-A108824; TR-14-81) Avail: NTIS HC A02/MF A01 CSCL 09/2

The problem of synchronizing communication between distributed processes whose speeds (steps per real time unit) vary dynamically is discussed. The implementation of a distributed local scheduler to find matching pairs is reported. The only means of synchronization are boolean 'flag' variables, each of which can be written by only one process and read by at most one other process. No global bounds in the speeds of processes are assumed. Processes with speed zero are considered dead. However, when their speed is nonzero then they execute their programs correctly. Dead processes do not harm the algorithms' performance with respect to pairs of other running processes. When the rate of change of the ratio of speeds of neighbour processes is bounded, then any two of these processes will establish communication within a constant number of steps of the slowest process with high likelihood. The implementation presented has the property of achieving relative real time response. The techniques can be used to solve other problems such as resource allocation and implementation of parallel languages such as CSP and Ada. Note that we do not have any probability assumptions about the system behavior, although our algorithms use the technique of probabilistic choice. GRA

N82-19438# Research Inst. of National Defence, Linkoeping (Sweden). Radiolab.

VARIATIONS IN PROPAGATION ATTENUATION AT THE FREQUENCIES 11, 18 AND 36 GHz [VARIATIONER I UTBREDNINGSDAEMPNING VID FREKVENSERNA 11, 18 OCH 36 GHz]

Bernt Danielsson and Lennart Nilsson May 1981 20 p refs In SWEDISH

(FOA-A-30028-E2; RI-1015/81) Avail: NTIS HC A02/MF A01

In order to assess the effect of variations in propagation attenuation on the performance of transmitters operating at frequencies > 10 GHz, field strengths were measured over a 15 km path with free visibility. At 18 and 36 GHz, the depolarization effects of the atmosphere were recorded. Data was processed with a PDP 11/10 computer at a sampling frequency of 5 Hz. Results show that atmospheric anomalies cause multipath propagation, resulting in strong variation of the attenuation with quick and deep fading, whereas signal variations due to precipitation develop more slowly. The influence grows when the frequency increases. Depolarization occurs in relation to important propagation disturbances. Author (ESA)

N82-19439# Eurospace, Paris (France).

TELEVISION SERVICES IN EUROPE IN THE AGE OF DIRECT SATELLITE TELEVISION [LES SERVICES NOUVEAUX DE TELEVISION ENVISAGEABLES EN EUROPE A L'AGE DU SATELLITE DE TELEVISION DIRECTE]

Bernard Gonner Paris ESA Jan. 1981 224 p refs In FRENCH

(Contract ESA-4139/79/F-FC(SC))

(ESA-CR(P)-1503) Avail: NTIS HC A10/MF A01

Consumer and industrial reaction to direct satellite television is discussed. Legal aspects raised at the Geneva conferences are summarized. Existing techniques are reviewed and the expansion of services is outlined. A country by country breakdown of the economic, social, cultural, and legal impact of satellite television is provided. The television and peritelevision market in Western Europe to the year 2000 is forecast, and the effect on this satellite television is evaluated. The outlook is good, with increased program variety, cheap teletext and increased quality leading to more receivers being bought and more satellites sold to countries outside Europe. Frequencies used for ground based

television transmission can be used for other purposes, e.g. citizens' band radio. Author (ESA)

N82-19440# Ferranti Ltd., Bracknell (England).
ANALOGUE SAR SIGNAL PROCESSING: DEVICE EVALUATION AND RADIATION TESTS
K. M. Harvey, M. A. B. Hugues, C. Lambert, D. W. Sergeant, and D. W. Cruse Paris ESA Nov. 1980 147 p refs (Contract ESA-3400/77/NL-HP(SC))
(Rept-3972-Issue-1; ESA-CR(P)-1512) Avail: NTIS HC A06/MF A01

For onboard satellite SAR signal processing, charge coupled video integrators for prefiltering/subaperture filtering, and a bucket brigade binary-analog correlator, were tested. Breadboard performance at room temperature and after X-irradiation is reported. Dark current is excessive in the video integrators and the transfer inefficiency is large. One device is insensitive to radiation up to 4.5 KRads, the other is sensitive to doses < 500 Rads, although both came from the same wafer. The correlator meets data processing and power supply immunity requirements, but does not meet low power and temperature stability requirements. No significant radiation damage is observed below 2 KRads. Author (ESA)

N82-19441# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.
RECOGNITION OF, AND DAMAGES CAUSED TO A RADAR ANTENNA BY A CARBON DIOXIDE LASER [UPPTAECKT AV OCH SKADOR PAA RADARANTENN MED CO2-LASER]
Kai Gullberg and Dietmar Letalick Nov. 1981 23 p refs In SWEDiSH
(FOA-C-30244-E1) Avail: NTIS HC A02/MF A01

The detection of radar antennas by reflection of laser radiation is discussed. The differences between antenna and other flat surface reflection is considered. The amount of radiation needed to inflict light or severe damage on an antenna is estimated for a 5.5 GHz spiral antenna. Findings are inconclusive. Author (ESA)

N82-19442# Bosch (Robert) G.m.b.H., Berlin (West Germany). Geschaeftsbereich Elektronik.
SPECTRUM SAVING SPEECH TRANSMISSION FOR LAND MOBILE RADIO. A STUDY ON SINGLE SIDEBAND TRANSMISSION IN 5 kHz CHANNELS FOR 2 AND 4 m BANDWIDTHS Final Report
Heribert Gorzel and Manfred Poetter Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 85 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-173; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,65

The spectrum efficiency of single sideband in the two and four m band was studied. Requirements on transmitter and receiver were investigated. Receiver and oscillator are synchronized by a short burst before any transmission, instead of by a continuous pilot carrier during the entire transmission. It is shown that the performance of current FM units is met at one fifth of the power. The problem of fast automatic gain control for compensating for the influence of multipath fading, especially at higher vehicular speeds, is not yet satisfactorily solved. Author (ESA)

N82-19443# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SIGNAL ANALYSIS USING THE MAXIMUM ENTROPY METHOD [SIGNAALANALYSE MET DE MAXIMALE ENTROPIEMETHODE]
W. Kuik Mar. 1981 43 p refs In DUTCH
(VTH-LR-316) Avail: NTIS HC A03/MF A01

The analysis of discrete series is explained using the maximum entropy method in order to solve data processing problems in the aeroelastic study of wind turbines. Discrete Fourier spectrum and maximum entropy spectrum are compared. This method searches for an autoregressive model for a series containing a maximum of information about entropy. The autoregressive model is outlined and the notions 'information' and 'entropy' in signal analysis are defined. Energy and phase spectrum construction, starting from an autoregressive model, is described, with examples. The maximum entropy method is valuable where Fourier transformation techniques hardly work or fail. Author (ESA)

N82-19444# European Space Agency, Paris (France).
MODELING OF THE INFLUENCE OF STATIC ACCELERATION ON SURFACE WAVE (QUARTZ) OSCILLATOR Ph.D. Thesis
Patrick Levesque Jan. 1982 149 p refs Transl. into ENGLISH from "Modelisation de l'Influence des Accelerations Statiques sur les Dispositifs a Ondes Elastiques de Surface", Rept. ONERA-NT-1981-3 ONERA, Paris, 1981 Original report in FRENCH previously announced as N82-14470
(ESA-TT-726; ONERA-NT-1981-3) Avail: NTIS HC A07/MF A01

The application of a static acceleration on a quartz oscillator, working in elastic surface wave mode, is modeled. Modification of the wave propagation speed through the substrate and its frequency are studied. Experiment proves that this frequency shift depends on the nature of the substrate through which the wave is propagating, but also on its dimensions and its mode of attachment. Theory confirms and explains these results, and also shows the relationship between the stresses arising in the substrate during the acceleration and the sensitivity to this acceleration of surface wave devices. Author (ESA)

N82-19445# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.
PLANNING OF A C-BAND PULSE DOPPLER RADAR WITH POLARIZATION DIVERSITY FOR ATMOSPHERIC RESEARCH IN THE MESOSCALE RANGE
Herbert Schuster Sep. 1981 49 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-750)
(DFVLR-Mitt-81-28; ESA-TT-750) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 11,80

A radar system was defined, suitable for research in cloud physics requiring measured values of meteorological parameters relevant to a complete model of the behavior of the observed object in space and time. This problem can be solved using remote sensing methods, especially radar measuring methods. A semimobile system, comprising computer controlled pulse Doppler radar with polarization diversity and digitized radar signal processing is recommended. The fundamental attributes of the radar system are summarized. Author (ESA)

N82-19446# National Telecommunications and Information Administration, Washington, D.C. Office of Policy Analysis and Development.
DIRECT BROADCAST SATELLITES: POLICIES, PROSPECTS, AND POTENTIAL COMPETITION
Kim E. Degnan, Kenneth R. Dunmore, and Vincent Sardella Mar. 1981 144 p refs
(PB82-110164; NTIA-SP-81-11) Avail: NTIS HC A07/MF A01 CSCL 17B

Potential service options and concentration for a direct broadcast satellite (DBS) television service are examined relative to regulatory issues. The conclusion is drawn that pay television is the most likely service, absent regulation, to be provided due to the large potential cashflow that offsets the high risk of the enterprise. The extent of competition with terrestrial distribution modes is examined with respect to substitutability and geography. Technical, cost, and demand characteristics are discussed in order to evaluate the potential for competing DBS systems. T.M.

N82-19447# National Telecommunications and Information Administration, Washington, D.C.
PROPOSED TECHNIQUES FOR ADDING FM BROADCAST STATIONS IN A MAJOR MARKET, PART 2
E. J. Haakinson Jul. 1981 27 p refs
(PB82-114240; NTIA/REPT-81-77-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 17B

To demonstrate the approach of adding assignments to a saturated major market, it is shown how the number of FM broadcast stations in the Washington, DC, market could be increased from the present 13 commercial and non-commercial stations to 21 assignments. Recommendations are made which,

if adopted, could increase significantly the number of FM broadcast stations in almost all markets. GRA

N82-19448# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
4 Nov. 1981 64 p refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 p 31-79
(AD-A108174; FTD-ID(RS)T-0940-81) Avail: NTIS HC A04/MF A01 CSCL 20/14

A statistical analysis of field focused systems and the properties of connected vibrator structures was made. The efficiency and input impedance of analyzing and reducing the directive gain and direction dispersion of the main maximum of the beam pattern of a sectional traveling wave antenna were derived and are discussed. An assessment of aircraft capacitive circuit medium wave antennas' efficiency is also presented. For individual titles, see N82-19449 through N82-19453.

N82-19449# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DECREASING DG AND DIRECTION DISPERSION OF MAIN MAXIMUM OF BEAM PATTERN OF SECTIONAL TRAVELING WAVE ANTENNA
V. I. Zamyatin and L. G. Korniyenko *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 1-17 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

Formulas to analyze and reduce the directive gain and direction dispersion of the main maximum of the beam pattern of a sectional traveling wave antenna when there are errors of the wave number in the system and phase errors at the sites of contact between the sections are presented. A condition of optimality of sectioning and a condition in which the limiting directive gain was missing were obtained. The effectiveness of the sampling of phase errors was studied. Results of a statistical analysis of the field of traveling wave sectional antennas are discussed. M.D.K.

N82-19450# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STATISTICS OF THE FIELD OF FOCUSED SYSTEMS
A. S. Yevseyev *In its* Antenna (Selected Articled) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 18-29 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

The average characteristics of a focal spot were examined in the focusing area when there were random phase errors. Calculated correlations and graphs which make it possible to estimate the decrease in field intensity in the focus and the expansion of the focal spot, depending on the numerical characteristics of the phase errors are presented. Author

N82-19451# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
EFFICIENCY AND INPUT IMPEDANCE OF PLANAR EMITTER PLACED NEAR THE INTERFACE
V. P. Kultsep *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 30-44 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

Strict general formulas were derived for complex input impedance of a random plane-parallel interface of an emitter with assigned current distribution. A calculation was made of the dependence of the input impedance and efficiency of the inphase planar disk emitter on its radius and the distance from the interface for emitters of any size. Results are presented and discussed. Author

N82-19452# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYSIS OF THE PROPERTIES OF CONNECTED VIBRATOR STRUCTURES
N. A. Bey and N. M. Yakusheva *In its* Antenna (Selected Articles) (FTD-ID(RS)-0940-81) 4 Nov. 1981 p 45-52 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

The phase velocities of the main waves propagating in connected infinite vibrator structures was solved by the method of integrated equations. The obtained correlations make it possible to link the phase velocities of the main waves with the geometric parameters of the system. A numerical analysis of the properties of connected vibrator structures arranged in th H-plane with equal geometric parameters is also discussed. M.D.K.

N82-19453# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ASSESSMENT OF AIRCRAFT CAPACITIVE CIRCUIT MEDIUM WAVE ANTENNAS ACCORDING TO THEIR EFFICIENCY
E. O. Brudnyy and L. Ya. Ilnitskiy *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0940-81) 4 Nov. 1981 p 53-59 refs Transl. into ENGLISH from Antenny (USSR), no. 15, 1972 (For primary document see N82-19448 10-32)
Avail: NTIS HC A04/MF A01 CSCL 20/14

A method for assessing aircraft capacitive circuit medium wave antennas according to their efficiency is presented. The measure of efficiency is the product of the antenna capacitance times the active altitude. An expression was obtained which links the antenna efficiency to its geometric dimensions. The suggested method discussed produces the optimal dimensions for aircraft capacitive circuit antennas direction during their designing. Author

N82-19454# Illinois Univ. at Urbana-Champaign.
WAVE PROPAGATION PROBLEMS IN CERTAIN ELASTIC ANISOTROPIC HALF SPACES Ph.D. Thesis
Constantine George Caracostis 1981 204 p
Avail: Univ. Microfilms Order No. 8129570

The Smirnov-Sobolev method of self-similar potentials is used to solve certain propagation problems in anisotropic media. The solutions are expressed in terms of analytic functions determined from the boundary conditions in a straightforward manner. The first problem concerns the two dimensional case of an orthotropic material under plain-strain conditions subjected to a suddenly applied line force on the surface or in the interior of a half space. The second type treats the three dimensional problem of a point force suddenly applied on the surface of a transversely isotropic half space. This solution is formed by a rotational superposition of the solutions for a plane strain and for an antiplane problem with appropriately defined boundary conditions. The mapping of the wave fields in the complex domain composed of a four-sheeted Riemann surface is examined in detail. Techniques used in the numerical treatment of certain singularities are discussed. Time histories for the displacements and stresses in the two dimensional case and as time histories of only the displacements in the three dimensional case are given.
Dissert. Abstr.

N82-19455# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANTENNA (SELECTED ARTICLES)
3 Dec. 1981 110 p refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 p 17-49, 106-162
(AD-A109174; FTD-ID(RS)T-0939-81) Avail: NTIS HC A06/MF A01 CSCL 09/5

Scattering of a spherical wave on truncated revolution bodies is considered. Broad-directional lens antennas made of an inhomogeneous dielectric are discussed. Modeling beam patterns of linear antennas is examined. Compensation for systematic weight deformations of parabolic radio telescope mirror systems is studied. Input impedance of a system made of intersecting low set vibrators is determined. For individual titles, see N82-19456 through N82-19460.

N82-19456# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SCATTERING OF A SPHERICAL WAVE ON TRUNCATED REVOLUTION BODIES
Yu. A. Yerukhimovich *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 1-35 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 36 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

A scattering field is analyzed on trucated revolution bodies formed by curves of the second order when they are irradiated from one focus by a source of a spherical wave. The analysis uses the method of curvilinear coordinates. The solution is obtained in the distant zone, in approximation of physical optics. The system of formulas describes the diagram of the scattering field in all space, including the transitional zones between the regions of the angles of the observation point. N.W.

N82-19457# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

BROAD-DIRECTIONAL LENS ANTENNAS MADE OF AN INHOMOGENEOUS DIELECTRIC

Ye. G. Zelkin and R. A. Petrova *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 36-53 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 19 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

Broad directional lens antennas are examined. Their refractive index is completed with the help of the conformal transform method. Calculation of the refractive and beam trajectory indices is made. N.W.

N82-19458# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

MODELING BEAM PATTERNS OF LINEAR ANTENNAS

K. S. Shcheglov *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 54-68 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 16 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

A method is examined for mathematical modeling on a computer of the beam patterns of antennas based on the use of Kotel'nikov's theorem. The values of the patterns for a number of reference directions are used for complete analysis of the properties of the pattern, including directional gain and scattering coefficient. The examined algorithm is applied to computing antennas by the Monte Carlo method which consists of modeling random patterns. N.W.

N82-19459# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COMPENSATION FOR SYSTEMATIC WEIGHT DEFORMATIONS OF MIRROR SYSTEM OF PARABOLIC RADIO TELESCOPES

B. A. Poperechenko and N. M. Feyzulla *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 69-84 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 17 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

An examination is made of the nature of the phase errors in field distribution in the aperture of a radio telescope which develop under the influence of weight deformations of the main mirror and the support structures of the irradiating system. Based on an analysis of the normed functions of individual components in the errors, a technique for their mutual compensation is suggested. N.W.

N82-19460# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

INPUT IMPEDANCE OF SYSTEM MADE OF INTERSECTING LOW-SET VIBRATORS

V. P. Kultsep *In its* Antenna (Selected Articles) (FTD-ID(RS)T-0939-81) 3 Dec. 1981 p 85-100 refs Transl. into ENGLISH from Antenny (USSR), no. 6, 1969 17 p (For primary document see N82-19455 10-32)

Avail: NTIS HC A06/MF A01 CSCL 09/5

The input impedance of a system, made of symmetrical vibrators with sinusoidal current distribution which intersect at the power point, is determined. The vibrators are suspended at a low altitude above the Earth. A single low set vibrator is examined as a particular case. Results are presented from measurements of the input impedance of the system of intersecting vibrators in the short-wave and medium-wave ranges. N.W.

N82-20115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

THE DSN RADIO SCIENCE SYSTEM MARK 3, 1980

B. J. Buckles *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 6-11 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 17B

N82-20120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SIDEBAND-AIDED RECEIVER ARRAYING

S. A. Butman, L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 39-54 refs (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 17B

N82-20127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NOISE TEMPERATURE AND NOISE FIGURE CONCEPTS: DC TO LIGHT

C. T. Stelzried *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 100-111 refs (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 20N

N82-20129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1981

E. B. Jackson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 121-126 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 20N

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-19461 Virginia Polytechnic Inst. and State Univ., Blacksburg.

FINITE-ELEMENT ANALYSIS FOR DESIGN OF CLASSICAL AND ELECTRONICALLY OPERATED MACHINES Ph.D. Thesis

Fakhry Ahmed Fouad 1981 251 p

Avail: Univ. Microfilms Order No. 8126257

A method for analysis of magnetic fields in electrical machines is developed. A modular approach is developed to analyze the effects of machine geometry on machine performance and to solve for the magnetic field for any set of winding excitation currents as well as for any relative stator to rotor angular position. This generalized finite element approach is applied to the calculation of various machine parameters and performance characteristics. These parameters include a rigorous calculation of the saturated values of machine inductances, core losses, flux density waveforms throughout the magnetic circuit, induced EMF's and flux distributions under various load conditions. These parameters are key elements in the dynamic simulation of such machine systems. The advantage of this generalized machine modeling is the ability to predict accurately machine performance characteristics during design stages using the digital computer. Dissert. Abstr.

N82-19462 Virginia Univ., Charlottesville.

DEVELOPMENT AND CHARACTERIZATION OF THE FLIP-CHIP DIODE Ph.D. Thesis

Claude Samuel Setzer 1981 436 p

Avail: Univ. Microfilms Order No. 8117918

The standard structure of the Schottky diode chip incorporated an ohmic contact on the back surface of the chip and an array of anodes on the front surface, one of which must be contacted by a sharply pointed whisker. This contact whisker is troublesome because it inherently has less than the desired mechanical stability and adds considerable uncertainty to choke structure design due

to inability to predict its exact shape. The development of a new millimeter-wave Schottky diode structure which eliminates the whisker completely and allows direct bonding of the anode to the RF choke structure. Detailed theoretical analysis of this new structure, the Flip-Chip, is presented and shows that it will be capable of not only adding the mechanical stability and predictability of a directly bonded structure, but will also allow improvement of diode sensitivity through reduction of parasitic elements. Also, complete details of technology necessary for fabrication of the device are presented, along with preliminary experimental performance data which indicate great promise for future uses of the Flip-Chip diode. Dissert. Abstr.

N82-19463 Alabama Univ. in Huntsville.
ANALYSIS AND SYNTHESIS OF BINARY SEQUENCES Ph.D. Thesis
Henry Eugene Stern 1981 176 p
Avail: Univ. Microfilms Order No. 8128325

A method which combines the concept of run length with the technique of piecewise polynomial convolution for rectangular waveforms, is proposed for the analysis of binary sequences of arbitrary length. The synthesis of short binary sequences with desired correlation properties is facilitated. Long binary sequences, or time series, are treated as the outcomes of a generalized Markov chain. Given a transition matrix, correlation of coefficients are calculated and simulation models to generate sample sequences tested. Conversely, given a set of correlation coefficients, a transition matrix, optimum in a least squares sense, is defined. For moderately long sequences, an iterative procedure is developed which combines the deterministic selection of run lengths with their statistical placement in the sequence. Examples of synthesis are given for the three techniques. Dissert. Abstr.

N82-19464 Utah Univ., Salt Lake City.
MATHEMATICAL AND GRAPHICAL TOOLS FOR THE CREATION OF COMPUTATIONAL ARRAYS Ph.D. Thesis
Uri Chanan Weiser 1981 148 p
Avail: Univ. Microfilms Order No. 8129930

A formalism for describing the behavior of computational networks at the algorithmic level is introduced. Formal mathematical models for delay and combinatorial elements establish a direct correspondence between mathematical expressions defining a function, and graphs representing the computational networks which compute that function. Different and often more efficient networks can be developed using transformations on either the graphs or the mathematical expressions describing those networks. These transformations are expressed by formal rules which exist in both the mathematical and the dual graphical form. The concept of a wavefront is presented to simplify the mathematical notation and to enhance understanding of the progression of sets of data elements through a computational network. Dissert. Abstr.

N82-19465 Royal Signals and Radar Establishment, Malvern (England).
A REVIEW OF MILLIMETRE WAVE DEVICES
A. J. Grant Jun. 1981 18 p refs
(RSRE-Memo-3372; BR81131) Copyright. Avail: Issuing Activity

Power sources in the 30 to 300 GHz band, corresponding to free space wavelengths from 1 cm to 1 mm are reviewed. The magnetron, the TWT, the carcinotron or backward wave oscillator, the gyrotron or cyclotron resonance maser, and the orbitron (which was demonstrated using an empty aluminium beer-can) are discussed. Solid state sources continue to make progress upwards in frequency and power. Transferred electron devices using InP produce 126 mW at 90 GHz, a level suitable for local oscillator applications. Si impatts demonstrate peak power of 13W ar 94 GHz with 8% efficiency. The tunnett diode, a variation of the impatt in which tunneling replaces avalanching, is useful above 300 GHz. Author (ESA)

N82-19466*# General Electric Co., Philadelphia, Pa. Space Systems Div.
ULTRA HIGH SPEED IMAGE PROCESSING TECHNIQUES Final Report
T. Anthony, D. F. Hoeschele, R. Connery, J. Ehland, and J. Billings Apr. 1981 75 p refs
(Contract NAS5-25654)
(NASA-CR-166771) Avail: NTIS HC A04/MF A01 CSCL 09C

Packaging techniques for ultra high speed image processing were developed. These techniques involve the development of a signal feedthrough technique through LSI/VLSI sapphire substrates. This allows the stacking of LSI/VLSI circuit substrates in a 3 dimensional package with greatly reduced length of interconnecting lines between the LSI/VLSI circuits. The reduced parasitic capacitances results in higher LSI/VLSI computational speeds at significantly reduced power consumption levels. S.L.

N82-19467# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A 12 GHz MIXER WITH PLANAR CIRCUITS IN A WAVEGUIDE
Eduardo Antonio Parada Tude Jul. 1981 25 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador, Bahia, 8-15 Jul. 1981
(INPE-2149-RPE/370) Avail: NTIS HC A02/MF A01

A 12 GHz mixer, used in satellite communications, which produces an intermediate frequency of 1 to 3 GHz is presented. The conversion is achieved by a Schottky diode mounted in a planar circuit in the waveguide. This technique consists of inserting a metal plate in the middle of the waveguide, parallel to the E plane. The image frequency was short circuited so as to obtain a lower conversion loss. A computer program was developed for this purpose, which calculates the line increment due to the short effect, in the ridge waveguide formed by the planar circuit. The prototype has presented low conversion loss (6 dB) and good reproducibility, which may be credited to ease of construction. S.L.

N82-19468# Technische Univ., Berlin (West Germany).
DESIGN OF A VERSATILE LSI MODULE FOR THE SIMPLE CONFIGURATION OF HIGH-THROUGHPUT REAL-TIME POLYPROCESSOR SYSTEMS Ph.D. Thesis
Richard W. Macmillan 1980 225 p refs
Avail: NTIS HC A10/MF A01

The design of a single LSI module which is capable of implementing a wide variety of real time multiple processor systems in a simple and inexpensive manner is described. Efficient communication between modules and the attainment of very high system throughput is emphasized. The 'Universal Module' ('UM'), contains two identical ports, thereby providing ease of interconnection and permitting the configuration of systems containing a virtually unlimited number of communication busses. Under the conditions of the UM protocol up to 16 UM's may be connected to each bus. In requesting a communication a UM must declare the resources, i.e., other UM's, it requires for its successful completion. S.L.

N82-19469# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TWO DIMENSIONAL FILTERS FOR DIGITAL PROCESSING OF IMAGES: DESIGN AND IMPLEMENTATION TECHNIQUES [FILTROS BIDIMENSIONAIS PARA PROCESSAMENTO DIGITAL DE IMAGENS: TECNICAS DE PROJETO E IMPLEMENTACAO]
Gilberto Camara Neto and Edson Alves Ribeiro Nov. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2273-PRE/053) Avail: NTIS HC A02/MF A01

Two design methods of two dimensional digital filters are presented. Finite impulse response filters which make possible linear phase frequency responses are emphasized. The design methods considered are windowing and transformations. In the windowing methods, a time limited function is sought, the Fourier transform of which would be a best approximation to a given frequency limited function. An approximate solution for the one dimensional case is the Kaiser window: a two dimensional Kaiser window is proposed. In the transformation method, a change of variables transforms a one dimensional frequency response into a two dimensional one. Finally, implementation of filters and their application is discussed for the case of LANDSAT images. S.L.

N82-19470# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

THE 10 MHz CRYSTAL FILTER FOR SCPC EARTH STATIONS

Helcio Aranha and Plinio Tissi Dec. 1981 28 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBFC, Salvador, Brazil, 8-15 Jul. 1981 (INPE-2286-PRE/062) Avail: NTIS HC A03/MF A01

The design of a crystal filter at 10 MHz for application as a narrow channel filter in Earth stations is described. Its realization and practical characteristics are also considered. A.R.H.

N82-19471# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ANALYSIS OF PHASE NOISE IN A J BAND TRANSMITTER [ANALISE DO RUIDO DE UM TRANSMISSOR NA FAIXA J]

Wilton Jose Fleming Dec. 1981 41 p refs In PORTUGUESE; ENGLISH summary (INPE-2294-NTE/178) Avail: NTIS HC A03/MF A01

The phase noise analysis of a frequency generation system using synthesizers and multipliers is described. Rules are shown which can be used in the definition of the system block diagram. An example is presented for a transmitter in band J. Author

N82-19472# Communications Research Centre, Ottawa (Ontario). Space Technology and Applications Branch.

A MICROWAVE FET OSCILLATOR DESIGN APPROACH AND ITS APPLICATION IN AN INJECTION LOCKED OSCILLATOR

P. Morrison and R. Douville Jan. 1982 47 p refs (CRC-1347) Avail: NTIS HC A03/MF A01

A low power 14 GHz MIC GaAs FET oscillator was designed. The analytical model of the oscillator and design approach used are discussed in detail. A shunt feedback oscillator configuration was employed. Approximations were made to account for FET large signal effects in the design for maximum oscillator output power. An expression relating oscillator output power to feedback loop loss is presented. The requirement for filtering in the feedback loop is discussed. Experimental results were compared with theory and found to be in good agreement. Output power was 10 dBm at 14.0 GHz. The injection locked characteristics of the oscillator were experimentally investigated. It was found that for a 15 dB injection gain, the locking bandwidth was 69 MHz. The FM noise properties and transient performance of the injection locked oscillator are presented. Author

N82-19473# Laboratory for Electronic Development of the Armed Forces, Oegstgeest (Netherlands).

MICAD: AN INTERACTIVE COMPUTER FOR THE DESIGN OF MICROWAVE CIRCUITS [MICAD EEN INTERACTIEF COMPUTER-PROGRAMMA VOOR HET ONTWERPEN VAN MICROGOLFCIRCUITS]

H. R. Vanes Jun. 1980 93 p refs In DUTCH (LEOK-TR-1980-06; TDCK-75000) Avail: NTIS HC A05/MF A01

The construction of an interactive computer program in the design of microwave circuits was examined. The microwave interactive computer aided design (MICAD) which can perform this task is presented. The system provides all the necessary data, organizes program execution, and computates 18 possible options, while data can be recalled by just one simple letter. Ten different elements and five indicators are included to describe the network. Transl. by E.A.K.

N82-19474# Naval Research Lab., Washington, D. C. Surface Chemistry Branch.

ELECTRON TRANSMISSION THROUGH AND REFLECTION BY AN ARBITRARY SET OF SQUARE POTENTIAL STEPS Interim Report

F. L. Carter 7 Dec. 1981 13 p refs (AD-A108630; NRL-MR-4680) Avail: NTIS HC A02/MF A01 CSCL 20/10

An exact analytic solution was derived for the transmission of electrons through a series of up to six square potential steps. From these an algorithm was derived which readily gives the solution for any arbitrary number of square potential steps. Author (GRA)

N82-19475# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

Y-CIRCULATOR WITH DIELECTRIC FILLER

A. K. Stolyarov, I. P. Tyukov, V. N. Shakhgedanov, and A. A. Shilova 10 Dec. 1981 6 p Transl. into ENGLISH from Russian Patent no. 216065 (11 Apr. 1968) p 45-46 (AD-A109175; FTD-ID(RS)T-1275-81) Avail: NTIS HC A02/MF A01 CSCL 09/5

A Y-circulator with a dielectric filler and ferrite insert located in the center of the waveguide branching, is investigated. The overall dimensions are reduced because the dielectric constant of ferrite and dielectric material from which the waveguide is made, are identical. Author

N82-19476# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

EVALUATION OF PARAMETERS OF THE OSCILLATORY MOTION OF DIGITAL SERVO SYSTEM IN A STEADY-STATE MODE

V. P. Strakhov and Ye. G. Kuznetsova 4 Dec. 1981 8 p refs Transl. into ENGLISH from Izv. Vyssh. Uch. Zaved., Priborostr. (USSR), v. 14, no. 6, 1971 p 44-47 (AD-A109314; FTD-ID(RS)T-1267-81) Avail: NTIS HC A02/MF A01 CSCL 09/3

A digital servo system characterized by the quantization of a signal respect to level and time is examined. The steady-state mode of the system is characterized by the emergence of an oscillating motion. The dependence of the parameters of the oscillating motion on the parameters of the system is given. R.J.F.

N82-19477# Carnegie-Mellon Univ., Pittsburgh, Pa. College of Engineering.

INTEGRATED DEVICES OF SEMICONDUCTOR METAL-OXIDES IN CONJUNCTION WITH SILICON FOR SOLID-STATE GAS SENSORS Progress Report, 1 Jan. 1980 - 30 May 1981

A. G. Jordan, G. N. Advani (Sierra Monitor Corp.), and D. Berg Jul. 1981 63 p refs (Contracts DE-AS02-77EV-04346; EE-77-S-02-4346) (DE82-000397; DOE/EV-04346/T1; COO-4346-3) Avail: NTIS HC A04/MF A01

Further progress in the use of SnO2 thin films as solid state gas sensors is reported. Films of SnO2, prepared by the radio frequency sputtering technique, were doped with antimony and tested in H2 and CO in order to elucidate the mechanisms of gas sensitivity. Improvements in the response and recovery times were then obtained by the incorporation of gold in the oxide material. Zeolite films were deposited on the SnO2 films in order to enhance the selectivity process of gas sensors. Finally, a working device was prepared using state-of-the-art fabrication techniques. GRA

N82-19478# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.

GALVANIC CHARGING IN AIR AND SPACE FLIGHT [GALVANOFORMUNG IN LUFT- UND RAUMFAHRT]

R. Suchentrunk and O. Tuscher 10 Jun. 1981 10 p refs Reprint from Galvanotech., (Cologne), v. 12, n. 70, 1979 In GERMAN Presented at DGLR-Jahrestagung 1979, Cologne (MBB-BB-485-O) Avail: NTIS HC A02/MF A01

Utilization of galvanic shaping for solving heavy finishing problems in the aerospace industry is discussed. Special galvanic electrolytes like nickel sulfate solutions and acid copper electrolytes are used to produce independent self supporting structural parts. The multiple application possibilities of this galvanic finishing process is described. Examples are given of production problems and how they are solved. It is indicated that galvanic process engineering is used increasingly in the production of complicated structures and for solving problems in industrial development and finishing. Transl. by E.A.K.

N82-19479# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

MICROWAVE TUBES. LITERATURE STUDY NUMBER 2 RELATING TO THE YEAR 1980 [MIKROVAAGSROER. LITTERATUROEVERSIKT NR 2. OMFATTANDE AAR 1980]

Herbert Steyskal Nov. 1981 135 p refs In SWEDISH

(FOA-C-30247-E) Avail: NTIS HC A07/MF A01

Literature on microwave tube utilization is reviewed. Traveling wave tubes account for most of the activity in conventional applications. Cyclotron resonance devices are commercially available for high efficiency generators. Ultra high frequency usages are expected to increase, due to the introduction of relativistic electron radiation devices which enable high performance to be achieved, e.g., 3 GW pulses in the superhigh frequencies with a relativistic reflex triode. Author (ESA)

N82-19480# Siemens A.G., Erlangen (West Germany). Forschungslab.

SUPERCONDUCTING NIOBIUM-TIN RESONATORS Final Report

Bernhard Hillebrand, Norbert Krause, Hans Pfister, Kurt Schnitzke, Yilmaz Uzel, and Karl Wohlleben Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 72 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-188; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,20

A preparation method was developed for covering a Nb substrate with Nb 35 n layers by exposing the substrate to saturated tin vapor for 3 to 4 hr at 1050 C. The method preanodizes the Nb substrate and heats it up. Alternatively, small amounts of SnF2 are added. With TE011 X-band resonators, critical flux densities up to 100 mT and quality factors up to 9.10 exp 10 (at 1.5 K) are reached. Average values amount to 60 mT and 2.10 exp 9 (at 1.5 K) and 1.10 exp 9 (at 4.2 K). Comparable results are obtained with TM010 resonators.

Author (ESA)

N82-19481# Stuttgart Univ. (West Germany). Inst. fuer Technische Optik.

CONTACTLESS OPTOELECTRONIC POSITION SENSING Final Report

Guenter Hege and Reinhold Litschel Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 53 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-191; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11,35

A photoelectric lateral perflectometer sensing system and an axial probe depth sensor were developed, since increasing automation in production processes gives rise to an equivalent demand in optoelectronic sensor systems for automatic measurement and control. Concentric circular grids are used for two dimensional sensing with the perflectometer as well as for automatic adjustment of the instrument. The resulting Moire patterns are detected by a matrix solid state image sensor. The use of light emitting diodes gives a small and rugged z axis probe. As with the autofocus, the measuring principle employs the concept of disappearing parallax. Accuracy in the submicrometer range makes it possible to use the perflectometer for dimensional measuring as well as for exact positioning of work pieces having moderate surface roughness and dimensions. The z axis probe has a capture range of + or - 1 mm and an accuracy of better than 1 micron even on rough surfaces.

Author (ESA)

N82-19482# Siemens A.G., Munich (West Germany). Forschungslab.

Ga (As, P): N - LED'S FOR MONOCHROMATIC ILLUMINATION Final Report, Dec. 1980

Ludwig Hoffmann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 68 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-198; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 14,30

The feasibility of decreasing Ga hole concentration to improve the internal quantum efficency of Ga As/sub 1-x/P/sub x/light emitting diodes doped with nitrogen was studied. It is assumed that the concentration determines the lifetime of the minority carriers. Continuous liquid phase epitaxial layers with thicknesses up to 15 microns were grown on exactly oriented 100 - surfaces of VPE layers with sufficient p-type doping. Two diagnostic techniques are developed: (1) nitrogen concentration measurement by photocurrent spectroscopy at 300 K; and (2) deep level energy determination by photocapacity measurement at 300 K. Author (ESA)

N82-19483# National Centre of Tribology, Risley (England). European Space Tribology Lab.

BRITISH AERODYNAMICS GROUP (BAE) SOLAR-ARRAY DRIVE MECHANISM: LIFE TEST, STRIPDOWN AND OPTICAL ENCODER EXAMINATION

A. J. Walton, J. Gillies, and J. A. Duvall Dec. 1980 31 p (ESA-TRIB-2; ISSN-0250-4448) Avail: NTIS HC A03/MF A01

A drive mechanism which rotates a satellite solar array at 1 rev/day was tested. The real time life test simulated actual satellite operating conditions of vacuum and temperature (including eclipses) and lasted four years. Termination was caused by a failure in the optical sensing elements of the position sensing digital encoder. The mechanism behaves according to specification as regards drive motor power, error angle compared with a 24 hr clock and performance of power slip rings. Examination at the end of the test shows the mechanism to be in excellent mechanical condition, there being no features (apart from the encoder) that might limit the life to less than the projected seven years. Results for the main parameters are summarized. Details of the post test examination, which includes the measurements made on the optical encoder elements, are given. Author (ESA)

N82-19484# National Centre of Tribology, Risley (England). European Space Tribology Lab.

THERMAL VACUUM REAL-LIFE TEST OF AN MARCONI SPACE AND DEFENCE SYSTEMS (MSDS) SOLAR-ARRAY DRIVE MECHANISM (MSDS 002). FIRST FOUR YEARS OF OPERATION

K. Parker, A. Douglas, and W. R. Burke, ed. Jan. 1981 40 p (ESA-TRIB-3; ISSN-0250-4449) Avail: NTIS HC A03/MF A01

The first part of a 7 yr life test on a mechanism which turns a satellite solar array at 1rev/day is reported. A thermal transfer shroud, surrounding the mechanism in a vacuum chamber, is held at a constant temperature of 22.5 C while the shaft temperature, measured near the top of the shaft at the large bearing, is changed at 6-monthly intervals so that it operates alternately at 60 and 10 C. At the beginning of each 6-monthly cycle, 30 eclipse simulations are performed, i.e., the shaft temperature is reduced from 60 C to 0 C in 72 min and is returned to 60 C in as short a time as possible. Apart from a very small increase in motor power during eclipse simulation, no changes in the mechanism parameters occur with temperature. The mechanism operates within motor power and angular rotation accuracy specifications. The electrical noise on all slip rings increased during the first two years, but then slowly decreased. Certain slip ring pairs show a noise level in excess of the arbitrary limits set at the start of the test, and two slip ring pairs give large periodic noise transients which may be due to mechanical damage to the slip rings or brushes. Author (ESA)

N82-19485# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

HIGH STABILITY COPLANAR OSCILLATORS

E. M. Bastida and P. Bergamini 1981 9 p refs Presented at 11th European Microwave Conf., Amsterdam, 7-11 Sep. 1981 (CISE-1720) Avail: NTIS HC A02/MF A01

The feasibility of various kinds of coplanar oscillators, stabilized by a high Q dielectric cavity, was demonstrated. Their performance is comparable with devices obtained with microstrip circuits. An X-band coplanar oscillator with a frequency versus temperature stability better than + or - 0.2 ppm/C, over the temperature range -50 to 50C, is described. It has a loaded quality factor Q sub L asymptotic to 3500, a drain pushing figure of 8 ppm/V, and particularly appealing FM noise characteristics. The coplanar approach allows overall reduction in oscillator size; it can be placed directly over the cavity on a monolithic chip (including the active portion of the linear oscillator), avoiding unwanted linear oscillator coupling anywhere in the circuit. Author (ESA)

N82-19486# Fondazione Ugo Bordoni, Rome (Italy).
THE GENERATION OF PSEUDORANDOM BINARY SEQUENCES IN PARALLEL [GENERAZIONE DI SEQUENZE BINARIE PSEUDOALEATORIE IN PARALLELO]
Odoardo Brugia, Maurizio Pioli (Face Standard), and William Wolfowicz Jul. 1981 13 p refs In ITALIAN
(FUB-9-1981) Avail: NTIS HC A02/MF A01

An equivalent circuit of a multiple feedback pseudorandom binary sequence generator is presented, characterized by operating at a submultiple of the frequency used in current devices. The reduction in working frequency may simplify the design of devices such as self synchronizing scramblers, reset scramblers, and line encoders. The implementation of the circuit is discussed. Two applications are described, using two and four frequency reduction factors. Author (ESA)

N82-19139*# Sundstrand Aviation-Rockford, Ill.
THE 400-HERTZ CONSTANT-SPEED ELECTRICAL GENERATION SYSTEMS
Richard McClung *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 125-146 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

N82-19144*# Boeing Commercial Airplane Co., Seattle, Wash.
ELECTRIC FLIGHT SYSTEMS
C. William Clay *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 213-234 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 09C

N82-20114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SETI DOWNCONVERTER
B. Crow *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 1-5 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09C

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-19487 Iowa Univ., Oakdale.
RADIATIVE HEAT TRANSFER IN TURBULENT MHD CHANNEL FLOW Ph.D. Thesis
Fariborz Alipour-Haghighi 1981 148 p
Avail: Univ. Microfilms Order No. 8128371

Radiative heat transfer in a MHD channel has been studied for fully developed turbulent flow of an electrically conducting fluid. A uniform magnetic field is imposed transverse to the flow direction between the electrically insulated parallel plates. Thermal entry region is analyzed for constant wall temperature including viscous dissipation and Joulean heating. A van Dreist mixing length model with Mei and Squire correction factor is used for eddy diffusivity of momentum and a modified Cebeci model is used for eddy conductivity. An exponential wide band model is employed in evaluation of radiative heat flux for a real gas. The tegro-differential equation for thermal energy transport is solved by a finite difference iterative method. It is shown that radiative heat transer is a major mechanism of heat transfer in the channel and accelerates the thermal development and results in reduced gas temperature profiles. Dissert. Abstr.

N82-19488 Pennsylvania Univ., Philadelphia.
STATIC AND HYDRODYNAMIC STUDIES OF THE CONFORMATION OF ADSORBED MACROMOLECULES AT THE SOLID/LIQUID INTERFACE Ph.D. Thesis
David Paul Yavorsky 1981 272 p
Avail: Univ. Microfilms Order No. 8127094

The structure of an adsorbed macromolecular layer at the solid/liquid interface under both stationary and flow conditions is examined. The conformation of adsorbed bovine serum albumin (BSA) is deduced from the thickness of surface layers formed on the pore walls of track etched (mica) membranes. Changes in membrane permeability due to protein adsorption are related directly to a net reduction in pore size or an equivalent adsorbed layer thickness. Complementary permeability measurements using electrolyte conduction, tracer diffusion, and pressure driven flow have verified the unique structural qualities of the track etched membrane and collectively demonstrate an ability to determine bare pore size with an accuracy of + or - 2A. The average static thickness of an adsorbed BSA layer, as derived from electrolyte conduction and tracer diffusion, was 43 + or - 3A independent of pore size. In comparison with the known BSA solution dimensions, this measured thickness is consistent with a monolayer of structurally unperturbed protein molecules each oriented in a 'side-on' position. Pronounced conformational changes in adsorbed BSA layers were observed under conditions of shear flow. Electrostatic interactions were also shown to significantly affect adsorbed protein conformation through changes in solution ionic strength and surface charge.
Dissert. Abstr.

N82-19489 Ecole Polytechnique Federale de Lausanne (Switzerland). Lab. d'Hydraulique.
[ACTIVITIES REPORT OF THE HYDRAULICS LABORATORY] Annual Report, 1980 [RAPPORT ANNUEL 1980: LABORATOIRE D'HYDRAULIQUE]
1980 59 p refs Partly in FRENCH and ENGLISH
Avail: Issuing Activity

Drag force, turbulence, flooding, air water interaction, and the hydraulics of steep channels with moveable bed were researched. Mathematical and scale models were used in order to investigate aspects of dam construction, including overflow, erosion, and silting. The hydraulic aspects of a hydroelectric power scheme were evaluated. Author (ESA)

N82-19490 Defence Research Information Centre, Orpington (England).
MAINTENANCE OF HYDROSTATIC TRANSMISSIONS
A. Esposito Oct. 1981 10 p Transl. into ENGLISH from Oleodinamica Pneumatica, (Italy) no. 9, 1980 p 156-159
(DRIC-T-6497; BR81311) Copyright. Avail: Issuing Activity

Problems in hydrostatic transmission maintenance are identified and ways of overcoming them are suggested. It is found that problems arise from lack of lubrication, impurities in the oil, and cavitation at the pump and at the motor. It is under suggested that under nonsevere operating conditions, oil and filter should be changed every year, or every 1500 to 2000 hr running time. Under severe operating conditions or in dusty environments, the interval should be every 6 months or 1000 hr. Author (ESA)

N82-19491 Admiralty Marine Technology Establishment, Teddington (England).
FREE-WAVE PROPAGATION IN FLUID-LOADED THICK-WALLED CIRCULAR PIPES
S. A. Lester Nov. 1981 20 p refs
(AMTE-N-TM-81903; BR81307) Copyright. Avail: Issuing Activity

Wave propagation and sound radiation by layered pipes is treated by analyzing the dispersion relation of an infinite thick-walled pipe which contains, and is surrounded by, and inviscid fluid. Pipe wall displacements satisfy the exact linear equations of elasticity. The interior and exterior fluids satisfy the scalar Helmholtz wave equation. The differential equations are solved by Fourier transforms, giving the dispersion relation which connects frequency with axial and circumferential wavenumbers. The dispersion relation is solved numerically, producing examples of axial wavenumber versus frequency plots for selected circumferential harmonics. Author (ESA)

N82-19492*# Southwest Research Inst., San Antonio, Tex. Engineering Sciences Div.
STUDY OF LIQUID SLOSH IN THE TRACKING AND DATA RELAY SATELLITE HYDRAZINE TANKS Final Report
Daniel D. Kana and Franklin T. Dodge Nov. 1981 124 p refs

(Contract NAS5-26482; SwRI Proj. 02-6539)
(NASA-CR-166745) Avail: NTIS HC A06/MF A01 CSCL 20D

An experimental study was conducted to provide data for evaluation of the parameters for an analytical mechanical model representation of liquid/interface dynamics in the TDRSS propellant tanks. Models were developed for two liquid-under ullage (forward tank) configurations and for one liquid-over-ullage (aft tank) configuration. However, additional test runs were conducted with liquids of different densities in both cases to allow separation of bladder stiffness and gravity effects under various simulated steady acceleration conditions. Both static and dynamic parameters are evaluated to provide a good prediction of observed results. Author

N82-19493*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF LOCATION IN AN ARRAY ON HEAT TRANSFER TO A CYLINDER IN CROSSFLOW

Robert J. Simoneau and G. James VanFossen, Jr. 1982 15 p refs Proposed for presentation at the 3rd Joint Thermophy. Fluids, Plasma and Heat Transfer Conf., St. Louis, 7-11 Jun. 1982
(NASA-TM-82797; E-1131) Avail: NTIS HC A02/MF A01 CSCL 20D

An experiment was conducted to measure the heat transfer from a heated cylinder in crossflow in an array of circular cylinders. All cylinders had a length-to-diameter ratio of 3.0. Both in-line and staggered array patterns were studied. The cylinders were spaced 2.67 diameters apart center-to-center in both the axial and transverse directions to the flow. The row containing the heated cylinder remained in a fixed position in the channel and the relative location of this row within the array was changed by adding up to five upstream rows. The working fluid was nitrogen gas at pressures from 100 to 600 kPa. The Reynolds number ranged based on cylinder diameter and average unobstructed channel velocity was from 5,000 to 125,000. Turbulence intensity: profiles were measured for each case at a point one half space upstream of the row containing the heated cylinder. The basis of comparison for all the heat transfer data was the single row with the heated cylinder. For the in-line cases the addition of a single row of cylinders upstream of the row containing the heated cylinder increased the heat transfer by an average of 50 percent above the base case. Adding up to five more rows caused no increase or decrease in heat transfer. Adding rows in the staggered array cases resulted in average increases in heat transfer of 21, 64, 58, 46, and 46 percent for one to five upstream rows, respectively. Author

N82-19494*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

HYDRODYNAMIC AND AERODYNAMIC BREAKUP OF LIQUID SHEETS

R. Ingebo 1982 5 p refs Proposed for presentation at the 2nd Intern. Conf. on Liquid Atomization and Spray Systems, Madison, Wisc., 20-24 Jun. 1982
(NASA-TM-82800; E1139) Avail: NTIS HC A02/MF A01 CSCL 20D

The effect of hydrodynamic, aerodynamic and liquid surface forces on the mean drop diameter of water sprays that are produced by the breakup of nonswirling and swirling water sheets in quiescent air and in airflows similar to those encountered in gas turbine combustors is investigated. The mean drop diameter is used to characterize fuel sprays and it is a very important factor in determining the performance and exhaust emissions of gas turbine combustors. S.L.

N82-19495*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.

INVESTIGATIONS OF FLOWFIELDS FOUND IN TYPICAL COMBUSTOR GEOMETRIES Semiannual Status Report, 1 Aug. 1981 - 31 Jan. 1982

D. G. Lilley 31 Jan. 1982 138 p refs
(Grant NAG3-74)
(NASA-CR-168585; SASR-3) Avail: NTIS HC A07/MF A01 CSCL 20D

Measurements and computations are being applied to an axisymmetric swirling flow, emerging from swirl vanes at angle phi, entering a large chamber test section via a sudden expansion of various side-wall angles alpha. New features are: the turbulence measurements are being performed on swirling as well as nonswirling flow; and all measurements and computations are also being performed on a confined jet flowfield with realistic downstream blockage. Recent activity falls into three categories: (1) Time-mean flowfield characterization by five-hole pitot probe measurements and by flow visualization; (2) Turbulence measurements by a variety of single- and multi-wire hot-wire probe techniques; and (3) Flowfield computations using the computer code developed during the previous year's research program. Author

N82-19496*# United Technologies Research Center, East Hartford, Conn.

MASS AND MOMENTUM TURBULENT TRANSPORT EXPERIMENTS WITH CONFINED COAXIAL JETS Interim Report, 18 Feb. - 18 Oct. 1981

B. V. Johnson and J. C. Bennett Nov. 1981 157 p refs
(Contract NAS3-22771)
(NASA-CR-165574; R81-915540-9) Avail: NTIS HC A08/MF A01 CSCL 20D

Downstream mixing of coaxial jets discharging in an expanded duct was studied to obtain data for the evaluation and improvement of turbulent transport models currently used in a variety of computational procedures throughout the propulsion community for combustor flow modeling. Flow visualization studies showed four major shear regions occurring; a wake region immediately downstream of the innet jet inlet duct; a shear region further downstream between the inner and annular jets; a recirculation zone; and a reattachment zone. A combination of turbulent momentum transport rate and two velocity component data were obtained from simultaneous measurements with a two color laser velocimeter (LV) system. Axial, radial and azimuthal velocities and turbulent momentum transport rate measurements in the r-z and r-theta planes were used to determine the mean value, second central moment (or rms fluctuation from mean), skewness and kurtosis for each data set probability density function (p.d.f.). A combination of turbulent mass transport rate, concentration and velocity data were obtained system. Velocity and mass transport in all three directions as well as concentration distributions were used to obtain the mean, second central moments, skewness and kurtosis for each p.d.f. These LV/LIF measurements also exposed the existence of a large region of countergradient turbulent axial mass transport in the region where the annular jet fluid was accelerating the inner jet fluid. S.L.

N82-19497# Technische Hogeschool, Eindhoven (Netherlands).

SHOCK TUBE DETERMINATION OF THE HEAT CONDUCTIVITY OF NON-IONIZED AND PARTIALLY IONIZED ARGON Ph.D. Thesis

Avraham Hirschberg 27 Feb. 1981 249 p refs
Avail: NTIS HC A11/MF A01

A procedure to determine the heat conductivity of a monatomic gas, from measurements of the structure of the unsteady thermal boundary layer at the end-wall of a shock tube, is proposed. In the non-ionized case the structure of the boundary layer determined by means of laser schlieren measurements appears to be self-similar. Improved analysis of the schlieren data and accurate pressure measurements yielded conductivity data with an accuracy of 4% for temperatures up to 7000 K. In the ionized case a model for the development of the thermal boundary layer was proposed to consider the processes of ionization and thermal relaxation. Data on electron and atom density profiles from laser schlieren measurements agree within 10% with theory for a moderate degree of ionization (3%). Quantitative information on radiative cooling was obtained from absorption and pressure measurements outside the boundary layer. Experimental information on the influence of ionization relaxation on the structure of the boundary layer and data on the ionization rate of hydrogen by collisions with argon atoms is also presented. M.D.K.

N82-19498*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HISTORICAL PERSPECTIVES ON THERMOSTRUCTURAL RESEARCH AT THE NACA LANGLEY AERONAUTICAL LABORATORY FROM 1948 TO 1958

Richard R. Heldenfels Feb. 1982 35 p refs Presented at

NASA Symp. on Computational Aspects of Heat Transfer in Struct., Hampton, Va., 3-5 Nov. 1981
(NASA-TM-83266; L-15104) Avail: NTIS HC A03/MF A01 CSCL 20D

Research on structural problems associated with aerodynamic heating, conducted by the National Advisory Committee for Aeronautics (NACA) during its last decade are described. The text of a special presentation given at the NASA Symposium on Computational Aspects of Heat Transfer in Structure is presented. Some early thermostructural research activities using charts is also discussed. The prinicipal message of the paper is that although vehicle oriented research programs speed development of new technology for specific missions, too much effort may be expended on developing technology which is never used because a vehicle is never built. A healthy research program must provide freedom to explore new ideas that have no obvious applications at the time to generate the technology that makes important, unanticipated flight or vehicle opportunities possible.
M.D.K.

N82-19499*# Nielsen Engineering and Research, Inc., Mountain View, Calif.

LAMINAR FLOW TRANSITION: A LARGE-EDDY SIMULATION APPROACH Final Report, 14 Jul. 1980 - 30 Sep. 1981

Sedat Biringen Washington NASA Feb. 1982 34 p refs
(Contract NAS1-16289)
(NASA-CR-3518; NEAR-TR-251) Avail: NTIS HC A03/MF A01 CSCL 20D

A vectorized, semi-implicit code was developed for the solution of the time-dependent, three dimensional equations of motion in plane Poiseuille flow by the large-eddy simulation technique. The code is tested by comparing results with those obtained from the solutions of the Orr-Sommerfeld equation. Comparisons indicate that finite-differences employed along the cross-stream direction act as an implicit filter. This removes the necessity of explicit filtering along this direction (where a nonhomogeneous mesh is used) for the simulation of laminar flow transition into turbulence in which small scale turbulence will be accounted for by a subgrid scale turbulence model. Author

N82-19500# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

TEMPERATURE DISTRIBUTION IN THE WALLS OF A CYLINDRICAL THERMAL CHAMBER: FORMULATION AND PROPOSED SOLUTION [DISTRIBUICAO DE TEMPERATURA NAS PAREDES DE UMA CAMARA TERMICA CILINDRICA FORMULACAO E PROPOSTA DE SOLUCAO]

Humberto Pontes Cardoso Nov. 1981 12 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 November 1981
(INPE-2267-PRE/048) Avail: NTIS HC A02/MF A01

A formulation and a proposed solution scheme by finite element method for determining the wall temperature distribution of a cylindrical thermal vacuum chamber cooled by refrigeration and heated by a cylindrical source is presented. Author

N82-19501# Houston Univ., Tex. Dept. of Mechanical Engineering.

SEARCH FOR LARGE-SCALE COHERENT STRUCTURES IN THE NEARLY SELF-PRESERVING REGION OF A TURBULENT AXISYMMETRIC JET Final Report, 1 Sep. 1979 - 31 Aug. 1980

A. K. M. F. Hussain Mar. 1981 32 p refs
(Contract F49620-79-C-0227; AF Proj. 2307)
(AD-A108334; AFOSR-81-0760TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

In an attempt to explore the existence of large-scale coherent structures in the self-preserving region of an axisymmetric free air jet, a 2.54 cm air jet at a Reynolds number of 46,000 has been investigated for distances in excess of 40 diameters using both long and short time-averaged space-time correlation measurements. Conventional space-time correlation data with probe separations in the streamwise direction by as much as 25 diameters suggest the existence of large-scale coherent structures centered off the jet axis. The radial extent of these structures is about one local jet diameter, and the azimuthal extent is about a quadrant of the cross-section. Time series of short time-averaged correlations between longitudinal velocity fluctuations obtained with two arrays of hot-wires separated in the streamwise direction strongly support the existence of these structures. Nearly periodic peaks and valleys were intermittently observed. A qualitative picture of the spatial characteristics of these structures was inferred from the short time-averaged cross correlation of these time series with a sinusoidal model function. Traces of instantaneous transverse velocity and Reynolds stress as well as the instantaneous velocity vector patterns obtained from a radial array of X-wires also depict existence of large-scale organized motions. Author (GRA)

N82-19502# New York Univ., Westbury. Dept. of Applied Science.

THE INVESTIGATION OF THE PROPAGATION MECHANISM OF PRESSURE FLUCTUATION IN TURBULENT FLOW Final Report

Victor Zakkay and Vincent Barra Feb. 1981 39 p refs
(Grant AF-AFOSR-0128-79; AF Proj. 2307)
(AD-A108498; NYU/DAS-81-23; AFOSR-81-0759TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

A one foot induction wind tunnel was built for the purpose of studying the coherent structure of turbulence. Simultaneous measurements of velocity, wall pressure and wall-shear fluctuations were made on the wall of a one foot pipe in a range of velocities from 30 to 700 ft/sec. The results presented here were obtained for flow conditions which differ significantly from those in previous studies. For the majority of the tests, the free stream velocity is in the high subsonic regime, and the Reynolds number is an order of magnitude higher than that for which the coherent structure has previously been investigated. The measurements were made on the wall of an axially symmetric one foot test section in order to insure true two dimensionality of the flow. GRA

N82-19503# Paris VI Univ. (France). Lab. de Luminescence.

RESEARCH ON THE EFFECTS OF HYDROSTATIC PRESSURE ON THE ELECTRONIC STATES OF IMPURITIES Final Report

J. Mattler Sep. 1981 15 p refs
(Grant DA-ERO-78-G-063; DA Proj. 1T1-61102-BH-57)
(AD-A108403) Avail: NTIS HC A02/MF A01 CSCL 20/4

The theoretically predicted shift of vibronic components and change of their distribution under high pressure were confirmed by the low temperature emission spectra of the natural crystal scapolite. The insensibility of the self-activated luminescence in the ZnS : B crystals to the high pressure action indicated that it comes from a tightly associated new luminescence center. The differences between the high pressure action on the cubic and hexagonal ZnS : Mn crystals are interpreted by the resonance energy transfer. The pressure shifts of the excitonic excitation bands in the ZnS and ZnSe crystals agree with the gap shifts calculated for these crystals but are smaller than the experimentally found pressure shifts of the donor-acceptor luminescence bands.
Author (GRA)

N82-19504# Naval Research Lab., Washington, D. C.

INFLUENCE OF VELOCITY SHEAR ON THE RAYLEIGH-TAYLOR INSTABILITY Interim Report

P. N. Guzdar, P. Satyanarayana, J. D. Huba, and S. L. Ossakow 16 Dec. 1981 27 p refs
(DNA Proj. S99-QAXH; RR0330244)
(AD-A108800; NRL-MR-4701) Avail: NTIS HC A03/MF A01 CSCL 14/1

The influence of a transverse velocity shear on the Rayleigh-Taylor instability is investigated. It is found that a sheared velocity flow can substantially reduce the growth rate of the Rayleigh-Taylor instability in the short wavelength regime (i.e., $kL > 1$ where L is the scale length of the density inhomogeneity), and causes the growth rate to maximize at $kL < 1.0$. Applications of this result to ionospheric phenomena (equatorial spread F (ESF) and ionospheric plasma clouds) are discussed. In particular, the effect of shear could account for, at times, the 100's of km modulation observed on the bottomside of the ESF ionosphere and the km scale size wavelengths observed in barium cloud prompt striation phenomena. Author (GRA)

N82-19505# Science Applications, Inc., El Segundo, Calif. Applied Mechanics Operation.

PERFORMANCE TECHNOLOGY PROGRAM (PTP-S 2). VOLUME 9: EVALUATION OF REENTRY VEHICLE NOSETIP TRANSITION AND HEAT TRANSFER IN THE AEDC HYPERBALLISTICS TRACK G Final Report, Dec. 1977 - Sep. 1979

A. T. Wassel, W. C. L. Shih, and R. J. Curtis Jan. 1981 105 p refs

(Contract F04702-77-C-0126)

(AD-A108848; SAI-063-81R-051-Vol-9; BMO-TR-81-61-Vol-9) Avail: NTIS HC A06/MF A01 CSCL 16/3

Boundary layer transition and surface heating distributions on graphite fine weave carbon-carbon, and metallic nosetip materials were derived from surface temperature responses measured in nitrogen environments during both free-flight and track-guided testing in the AEDC Hyperballistics Range/Track G. Innovative test procedures were developed, and heat transfer results were validated against established theory through experiments using a super-smooth tungsten model. Quantitative definitions of mean transition front locations were established by deriving heat flux distributions from measured temperatures, and comparisons made with existing nosetip transition correlations. Qualitative transition locations were inferred directly from temperature distributions to investigate preferred orientations on fine weave nosetips. Levels of roughness augmented heat transfer were generally shown to be below values predicted by state of the art methods. Author (GRA)

N82-19506# Tel-Aviv Univ. (Israel). Dept. of Applied Mathematics.

FINITE ELEMENTS FOR FLUID DYNAMICS. SUPERCRITICAL DESIGN Final Report

Nima Geffen and Sara Yaniv Oct. 1981 135 p refs

(Grant AF-AFOSR-0017-81; AF Proj. 2307)

(AD-A108983; AFOSR-81-0867TR) Avail: NTIS HC A07/MF A01 CSCL 20/4

The mathematical modeling of a physical continuum by a set of first-order partial differential equations is commonly redundant, i.e., it includes more equations than unknowns. A simple analysis gives the reduced set, which fully determines the field quantities satisfying appropriately prescribed initial and boundary conditions. An algebraic look at the system provides the appropriate choice for descretization, which is a necessary condition for solvability and stability. The same is tried for a number of variational representations of the field in terms of primitive variables. A few of the latter formulations are new. Author (GRA)

N82-19507# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.

SURFACE LAYER ORIENTATION COORDINATION FOR BOUNDARY LAYER CALCULATIONS ON GENERAL CONFIGURATIONS [OBERFLAECHENORIENTIERTE KOORDINATEN FUER GRENZSCHICHTBERECHNUNGEN AN ALLGEMEINEN KONFIGURATIONEN]

E. H. Hirschel 23 Apr. 1981 28 p refs In GERMAN

(MBB-FE-122/S/PUB/41; DGLR-81-014) Avail: NTIS HC A03/MF A01

Three dimensional boundary layered bodies were calculated by coordinate system. General wing and fuselage surface configurations made for curvilinear, nonorthogonal, local monoclinic coordinates, and the boundary layer coordinates for calculations of the first degree show an exception for these coordinates. Metric tensors and curved tensors on surfaces are illustrated, transformation laws Cartesian coordinates of friction free foreign flow in the boundary layer coordinates are reported. The tensorial concepts are applied in the formulation of boundary layer equations and the calculation of the flow pattern of friction free foreign flow and boundary wall flows are detailed. Transl. by E.A.K.

N82-19508# Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium). Heat Pipe Caloduc.

HIGH PERFORMANCE VARIABLE CONDUCTANCE HEAT PIPE (VCHP) FOLLOW-ON DEVELOPMENT: PHASE 2 Final Report

Paris ESA 27 Apr. 1981 82 p refs 2 Vol.

(Contract ESA-3737/78)

(SABCA-JPM/LN/HO5/NO144-Vol-1; ESA-CR(P)-1497-Vol-1) Avail: NTIS HC A05/MF A01

Design characterization tests, and wick optimization of a VCHP used for spacecraft temperature control are summarized. The 1 cm diameter VCHP was subjected to adverse environment, aging, and thermal tests. An ammonia heat carrier, and cold gas reservoir conductance control are used. Heat conductance is 100 Wm, even in zero gravity. Performance is maintained when control gas is added to the working fluid. The gas reservoir achieves a 5 C control range when input power varies from 2 to 120 W, with an effective length of 0.75 m (90 Wm). The stainless steel pipe is bendable and performs well up to 30 mm adverse tilt, and can start up at 120 W from -40 C. Theoretical expressions for a saturated wick were used to optimize the wick with respect to its porosity and fiber diameter. Results show that for a specified capillary pressure limit, a porosity of 0.79 gives the highest permeability. The corresponding fiber diameter is then set such that the expressions for the capillary pressure limit give the required value. Author (ESA)

N82-19509# Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium). Heat Pipe Caloduc.

FOLLOW-ON DEVELOPMENT OF SMALL CRYOGENIC HEAT PIPES: PHASE 2 REPORT

Paris ESA Feb. 1981 102 p refs 2 Vol.

(Contract ESA-3737/78)

(SABCA-JPM/LN/HO5/N11-Vol-2; ESA-CR(P)-1497-Vol-2) Avail: NTIS HC A06/MF A01

Cryogenic heat pipe literature is reviewed and a 6 mm pipe is described. Most cryopipes derive from grooved profiles developed for use at ambient temperatures, and have diameters > 10 mm. Below 10 mm, only artery geometries provide appreciable power transport capabilities, but these geometries present pressure containment problems due to the high liquid inventories involved. The 6 mm pipe is based on classical heat pipes featuring ammonia in a stainless steel tube and a single layer wall capillary structure. The ammonia is replaced by methane, nitrogen, or ethane. The pipe performs well in the 70 to 150 K range. It is suitable for spaceborne low power sensors, detectors, and low noise amplifiers. Author (ESA)

N82-19510# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Inst. fuer Experimentelle Stroemungsmechanik.

AN INVESTIGATION OF WALL PRESSURE FLUCTUATIONS BEHIND A SUDDEN ENLARGEMENT OF THE CROSS SECTIONAL AREA OF A ROUND PIPE

Bernhard Stahl Aug. 1981 74 p refs In GERMAN; ENGLISH summary

(DFVLR-FB-81-35) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 13,35

Wall pressure fluctuations behind an abrupt enlargement of a round pipe cross section, where flowing air forms a turbulent mixing zone generating aerodynamic noise, were investigated theoretically and experimentally. Microphone measurements along the pipe wall indicate that the greatest part of the energy lies in the low frequency wall pressure fluctuations, and that these fluctuations encompass the entire mixing zone. The propagating acoustic modes in the flow field within the pipe were computed using the wave equation, and compared with the experimentally determined pipe resonances. Narrow band measurements made with different boundary conditions (open pipe end, anechoically closed pipe) show that the resonances occurring in the pipe can strongly influence the pressure fluctuations. For the low frequency pressure fluctuations, mode decomposition shows that most of the energy lies in the axisymmetric mode $m = 0$. Author (ESA)

N82-19511# Delft Hydraulics Lab. (Netherlands). Mathematics Branch.

ON THE NEUMANN PROBLEM FOR THE PRESSURE IN A NAVIER-STOKES MODEL

B. J. Alfrink Aug. 1981 13 p refs Presented at 2nd Intern. Conf. on Numerical Methods in Laminar and Turbulent Flow, Venice, 13-16 Jul. 1981

(Publ-257) Avail: NTIS HC A02/MF A01

The numerical solution of two dimensional viscous incompressible fluid flow is treated. As the transient pressure solution is required, the differential system is formulated in terms

of primitive variables. The equation of motion is split into divergence free and curl free parts. The pressure is solved, using the marker and cell algorithm. The Neumann problem for the pressure must satisfy a Gauss theorem. Care has to be taken to fulfill this compatibility condition in discrete form. Results show that by using a regular grid this is not realized in general. Particular attention is paid to the treatment of boundary conditions on a space-staggered grid. Author (ESA)

N82-19512# Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.

TRANSID: A COMPUTER PROGRAM FOR THE ANALYSIS OF HYDRAULIC TRANSIENTS IN CONDENSER COOLING CIRCUITS

A. Capozza 1981 43 p refs Presented at 5th Intern. Symp. on Water Column Separation, Obernach, West Germany, 28-30 Sep. 1981 Sponsored by Ente Nazionale per l'Energia Eletricca (CISE-1722) Avail: NTIS HC A03/MF A01

A computer program to predict the hazards of a given pump regime to the integrity of a cooling circuit was developed. The computer program is based on models of overpressures resulting from water column separation phenomena induced by strong and swift variations of cooling water flow rate in the circuit. The TRANSID version, termed TR/2, is described. The TRANSID code is written in FORTRAN IV language. It runs on an IBM 4341 as well as on a CDC CYBER 76. The total storage occupation, including the necessary system routines, is equivalent to 360 Kbytes on an IBM 4341 and 35 Kwords on a CYBER 76. The CPU time, for time step and for space mesh, is equivalent to 10 msec and 1 msec. Pump trip-off transients predicted by the TR/2 code are compared with in situ condenser cooling circuit measurements. Author (ESA)

N82-19513# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ACTA MECHANICA SINICA (SELECTED ARTICLES)

12 Nov. 1981 74 p refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 p 18-28, 38-47, 84-99 (AD-A108208; FTD-ID(RS)T-0708-81) Avail: NTIS HC A04/MF A01 CSCL 20/4

Aerodynamic analyses of bodies in hypersonic source flow fields were made. Measurements of the static and dynamic stability derivatives of conical models in shock tunnels were obtained. Laminar heat transfer with mass injection and chemical reaction was investigated. Numerical calculation of the steady two dimensional axi-symmetrical turbulent boundary layer of a compressible fluid was also made. Results are presented and discussed. For individual titles, see N82-19514 through N82-19518.

N82-19514# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

NUMERICAL CALCULATION OF STEADY TWO-DIMENSIONAL AXI-SYMMETRICAL TURBULENT BOUNDARY LAYER OF A COMPRESSIBLE FLUID

Wang Ying-shih *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 1-23 refs Transl. into ENGLISH from Acta. Mech. Sinica (China), no. 1, 1980 23 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A momentum equation expressed by the stress tensor was employed to derive the momentum equation of a non-rotational steady axi-symmetrical turbulent boundary layer of a compressible fluid in the axi-symmetrical coordinate system. It was found that if the flow in the duct was to be treated as viscous fluid everywhere then the curvature of the duct and the rate of variation of the curvature along the direction of the flow cannot be too large. This was not proven in existing literature. Based on the set of equations proposed in this paper, a computer program is compiled and a numerical example is computed. M.D.K.

N82-19515# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LAMINAR HEAT TRANSFER WITH MASS INJECTION AND CHEMICAL REACTION

Zu Tie-lin *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 24-43 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 20 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A general stoichiometric formula was derived to simplify a boundary layer problem with mass injection and chemical reaction. An analysis was performed using chemical equilibrium as an example. The calculated results were found to be consistent with the experimental ones. When the amount of injection is zero, the relevant data were in good agreement with the results. Finally, it was pointed out that with the increasing available energy of the exo-thermic reaction the effect of Lewis number on heat transfer decreases as the capability of heat generating reactions increases. M.D.K.

N82-19516# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE MEASUREMENTS OF THE STATIC AND DYNAMIC STABILITY DERIVATIVES OF CONICAL MODELS IN THE SHOCK TUNNEL

Jia-huan Ma, Zhong-heng Tang, Xiao-ping Zhang, and Yan-ping Guo *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 44-52 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 9 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

An experiment was conducted in a JF-8 reflection type shock tunnel. To extend the range of application of the shock tunnel on the one hand, and to initiate the experimental study of hypersonic dynamic stability some effort was spent on modeling and angular measurement. Measurements of 1.5-2.0 cycles of pitching angle motion $\theta c = 10$ deg and 11 deg cones in a hypersonic flow of M infinity = 9.0 with the model free flight method were obtained. Through data processing technique, not only the static stability derivatives were obtained, but also the preliminary results of the dynamic stability. M.D.K.

N82-19517# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LEAST SQUARES FINITE ELEMENT ANALYSIS OF STEADY HIGH SUBSONIC PLANE POTENTIAL FLOWS

Bo-nan Jiang and Jia-zhen Chai *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 53-59 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 7 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

A least squares finite element method was used to analyze steady, subsonic plane potential flows. Several advantages of the method for solving problems of compressible potential flows are discussed. An iteration method was employed to find the numerical solutions. Both the variable stiffness and constant stiffness models were tried. It was found that the variable stiffness method is especially suitable for high subsonic flows. M.D.K.

N82-19518# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE AERODYNAMICAL ANALYSIS OF BODY IN HYPERSONIC SOURCE FLOW FIELD

Guo-can Ling *In its* Acta Mech. Sinica (Selected Articles) (FTD-ID(RS)T-0708-81) 12 Nov. 1981 p 60-70 refs Transl. into ENGLISH from Acta Mech. Sinica (China), no. 1, 1980 11 p (For primary document see N82-19513 10-34)
Avail: NTIS HC A04/MF A01 CSCL 20/4

The hypersonic source flow field, a typical non-uniform free stream flow field, around a body was investigated. Various aerodynamic coefficients were obtained by means of Newton's theory. Analysis of the effects of the non-uniformity of the free stream was emphasized. It was found that under the condition of small angle of attack the analytical results are satisfactory. M.D.K.

N82-19519# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Fluid Dynamics Panel.

A COMPILATION OF UNSTEADY TURBULENT BOUNDARY LAYER EXPERIMENTAL DATA

L. W. Carr (Army Aeromechanics Lab., Ames Research Center, Calif.) London Nov. 1981 56 p refs
(AGARD-AG-265; ISBN-92-835-1406-8) Avail: NTIS HC A04/MF A01

A comprehensive literature search was conducted and those experiments related to unsteady turbulent boundary layer behavior were cataloged. In addition, an international survey of industrial, university, and governmental research laboratories was made, in which experimental programs associated with unsteady turbulent boundary layer research were identified. Pertinent references were reviewed and classified based on the technical emphasis of the various experiments. Experiments that include instantaneous or ensemble averaged profiles of boundary layer variables are stressed. Detailed reviews that include descriptions of the experimental apparatus, flow conditions, summaries of acquired data, and significant conclusions are made. The measurements of these experiments that exist in digital form have been stored on magnetic tape, and instructions are presented for accessing these data sets for further analysis. S.L.

N82-19564# Shock and Vibration Information Center (Defense), Washington, D. C.
VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENA, PART 2
S. T. Fleischmann and D. W. Sallet (Maryland Univ., College Park) *In its* The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 15-24 refs (For primary document see N82-19562 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-19520# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AUTOMATIC ANALYSIS OF MULTISPECTRAL IMAGES
Luciano Vieira Dutra, Ricado Cartaxo Modesto deSouza, Fernando Augusto Mitsuo, II, and Jose Carlos Moreira Aug. 1981 33 p refs In PORTUGUESE; ENGLISH summary
(INPE-2212-MD/009) Avail: NTIS HC A03/MF A01

Some ideas of automatic multispectral image analysis are introduced. Automatic multispectral image analysis plays a central role in numerically oriented remote sensing systems. It presupposes the utilization of electronic equipments, mainly computers and their peripherals, to help people to interpret the information contained in multispectral digital imagery. This necessity derives from the great amount of multispectral data gathered by remote sensors within satellites and airplanes. When the number of channels or spectral bands is increased, the interpretation becomes more complex and subjective. In some cases, for example, in harvest estimation in national or regional level, it is imperative to use computer systems to complete the work within the time required. Automatic analysis also aimes to eliminate subjective factors that appear in the human interpretation, so increasing the global precision. R.J.F.

N82-19521*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
HIGH-SPEED LASER ANEMOMETER SYSTEM FOR INTRA-ROTOR FLOW MAPPING IN TURBOMACHINERY
J. Anthony Powell, Anthony J. Strazisar, and Richard G. Seasholtz Feb. 1982 22 p refs
(NASA-TP-1663; E-276) Avail: NTIS HC A02/MF A01 CSCL 14B

A fringe-type laser anemometer with innovative features is described. The innovative features include: (1) rapid, efficient data acquisition processes, (2) detailed graphic display of data being accumulated, and (3) input laser-beam positioning that allows greater optical access to the intrarotor region. Results are presented that demonstrate the anemometer's capability in flow mapping within a transonic axial-flow compressor rotor. M.D.K.

N82-19522# Army Electronics Research and Development Command, Fort Monmouth, N. J. Combat Surveillance and Target Acquisition Lab.
RADIATION AND TEMPERATURE TESTS OF CADMIUM TELLURIDE DETECTORS Research and Development Technical Report, Oct. 1980 - Oct. 1981
Ockle E. Johnson Nov. 1981 36 p
(DA Proj. 1L1-62703-DH-93)
(AD-A108774; DELCS-TR-81-3) Avail: NTIS HC A03/MF A01 CSCL 18/4

The testing of CdTe sensors together with front end electronics developed by Radiation Monitoring Devices, Inc. for Radiac Division CS&TA Laboratory, Fort Monmouth, N.J. is described. These new solid state sensors show promise, in terms of miniature size and sensitivity, toward the development goal of wrist-watch-sized military radiac. The unit was to operate from .01 mR/h to 1,000,000 mR/h using the least of number of sensors. GRA

N82-19523# Range Commanders Council, White Sands Missile Range, N. Mex. Telecommunications Group.
INSTRUMENTATION TIMING SYSTEMS Final Report
Nov. 1981 187 p Supersedes TCG-123-72
(AD-A109005; TCG-123-81; TCG-123-72) Avail: NTIS HC A09/MF A01 CSCL 16/1

An update of Document 123-72, published April 1972 is presented. It describes the timing systems and facilities available at the various Range Commanders Council member and associate member ranges. GRA

N82-19524# Texas Technological Univ., Lubbock. Dept. of Electrical Engineering.
SPACE-VARIANT OPTICAL SYSTEMS Annual Report, 30 Sep. 1980 - 30 Sep. 1981
John F. Walkup and Thomas F. Krile Nov. 1981 15 p refs
(Grant AF-AFOSR-0076-79; AF Proj. 2305)
(AD-A109083; AFOSR-81-0834TR) Avail: NTIS HC A02/MF A01 CSCL 14/5

Analytical and experimental investigations of 2-D space-variant optical processing techniques were conducted. Coherent processing investigations have included (1) an experimental study of the characteristics of photoresist phase masks for multiplex holography, (2) the development of facility for generating high quality computer-generated holograms by use of a laser plotter, and (3) analytical investigation of an idea for using 1-D techniques to perform 2-D space variant operations. In the incoherent processing area experiments have proceeded to test the tristimulus-based technique for performing complex operations using hue, saturation, and intensity parameters to represent complex numbers. Author (GRA)

N82-19525# Utah State Univ., Bedford, Mass. Electro-Dynamics Lab.
CRYOGENICALLY COOLED INFRARED INTERFEROMETRIC SPECTROMETERS
Ronald J. Huppi and Allan J. Steed 30 Jun. 1981 52 p
(Contract F19628-78-C-0018; AF Proj. 7670; DNA Proj. S99-QAXH)
(AD-A108868; EDL-SRL-81-1; AFGL-TR-81-0201; SR-2) Avail: NTIS HC A04/MF A01 CSCL 17/5

Very sensitive Fourier transform spectrometers (FTS's) have been developed for infrared measurements utilizing advanced technology to achieve stable operation at very low temperatures. All of the structural, optical, and detector components used to construct these spectrometers are cryogenically cooled to improve the sensitivity of their detectors and to eliminate unwanted background emission signals from the components. Various designs of cooled FTS systems which have been successfully used and tested by USU and AFGL are presented in the paper. The performance specifications, the advantages, and the limitations of each technique are discussed. Also, general evaluations of the advantages and the limitations of cooling an FTS are given. Author (GRA)

N82-19526# Societe pour le Perfectionnement des Materiels et Equipements Aerospatiaux, Toulouse (France). Lab. d'Essais d'Environnement.

DEFINITION STUDY ON MULTISHAKERS FOR VIBRATION TESTING

J. Merlet and J. C. Pasquet Paris ESA 5 Aug. 1981 179 p Partly in FRENCH and ENGLISH

(Contract ESTEC-4515/80/NL-PP(SC))

(SOPEMEA-ET-17004; ESA-CR(P)-1499) Avail: NTIS HC A09/MF A01

The mechanical coupling of two 140 KN electrodynamic shakers for random vibration testing of Ariane payloads is described. The shakers placed side by side, operate in a range from 5 to 2000 Hz. Tests at 11 g between 20 and 2000 Hz can be performed. Time required for changing the axis of vibration is cut since no manual handling is required. Vertical and horizontal excitation tables are provided. For horizontal tests, a control system based on hydrostatic bearings is used. The table is highly rigid, with satisfactory transverse motion. Author (ESA)

N82-19527# Technische Universitaet, Brunswick (West Germany). Inst. fuer Thermodynamik.

CONCEPTION OF AN APPARATUS FOR PRESSURE, DENSITY, AND TEMPERATURE MEASUREMENTS IN THE CRITICAL REGION OF PURE FLUIDS IN SPACELAB Final Report, Feb. 1979

Wolfgang Wagner, Hans-Georg Kratz, and Willi Pentermann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 40 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-W-81-026; ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Gemany DM 8,40

A multicell arrangement, allowing isochoric pressure, density and temperature measurements, in the critical region of pure fluids in order to establish their thermodynamic properties in the absence of gravity, is described. The knowledge of these properties is a prerequisite for obtaining correct equations of state and strongly affects the dimensioning of chemical engineering processing plants. Fundamental aspects of measuring thermodynamic data in the critical region are discussed and applied to the Spacelab environment. The layout of the apparatus, its temperature control, and the instrumentation for density and pressure measurements are described. Author (ESA)

N82-19528# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.

DETAILED INVESTIGATION OF A TIME OF FLIGHT NEUTRON SPECTROMETER Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)

T. Elevant, J. Lorenzen (Studsvik Energiteknik AB), and B. Trostell (Studsvik Science Research Lab., Sweden) Feb. 1981 53 p refs Sponsored by Euratom and JET

(TRITA-PFU-81-01; ISSN-0348-7644) Avail: NTIS HC A04/MF A01

A neutron spectrometer and telescope based on double elastic interaction in two scintillators was tested on two neutron sources: a solid deuterium titanium target for D(d, n)He3 reaction, and a tritium gas cell for T(p, n)He3. The spectrometer provides a relative resolution of the ion temperature from 20% to 70% at ion temperatures around 1 keV and a flight path length of 2 m. For ion temperatures around 5 keV, the figures are 10% to 20% and for 10 keV, 7% to 10%. The telescope provides spatial resolutions from 0.25 to 0.50 m with flight path lengths from 0.6 to 1.3 m. The width of the energy peak of a neutron source used for calibrating must be known to within a few keV to obtain adequate resolutions. Author (ESA)

N82-19529# Stuttgart Univ. (West Germany). Inst. for Clock Engineering and Precision Mechanics.

DIGITAL TIME CONTROL FOR CAMERA SHUTTERS

Manfred Ackermann Jul. 1980 37 p refs Transl. into English of mono. "Digitale Zeitsteuerung fuer Kameraverschlusse" West Germany Sponsored by Bundesministerium fuer Forschung und Technologie, Bonn

(PB82-116328; BMFT-FB-T-80-028) Avail: NTIS HC A03/MF A01 CSCL 14E

The employment of a digital circuitry instead of mechanical escapements for the shutter control of automatically controlled exposure meters in still cameras is discussed. A way to determine the proper exposure time is described. Automatic exposure has the advantage that it summarizes digitally the light quantities which enter when the shutter is open. It is found that exposure control has the possibility for accuracy, especially when lighting conditions are changing, and also at long exposure times. GRA

N82-20124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

MASTER TIMING SYSTEM MEASUREMENTS

E. F. Endsley *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 70-74 (For primary document see N82-20113 10-99)

Avail: NTIS HC A07/MF A01 CSCL 14B

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-19530# Sigma Tau Standards Corp., Tuscaloosa, Ala.

LIGHTWEIGHT HYDROGEN MASER Interim Report, 1 Oct. 1980 - 30 Jun. 1981

Harry E. Peters Griffiss AFB, N.Y. RADC Oct. 1981 14 p refs

(Contract F19628-79-C-0104; AF Proj. 4600)

(AD-A108628; Rept-102-3; RADC-TR-81-270) Avail: NTIS HC A02/MF A01 CSCL 20/5

Based upon a new approach to cavity resonator design, an atomic hydrogen maser frequency standard was developed which is smaller and lighter by a factor of eight from previous hydrogen maser designs, but exhibits improved performance over other types of atomic standard. An operational prototype device is presently in the final assembly stage. Author (GRA)

N82-19531# Rochester Univ., N. Y. Dept. of Chemistry.

ON THE SYNERGISTIC EFFECTS OF LASER/PHONON-STIMULATED PROCESSES: A MASTER EQUATION APPROACH Interim Technical Report

Jui-teng Lin and Thomas F. George Dec. 1981 17 p refs Submitted for publication

(Contract N00014-80-C-0472; NR Proj. 056-749)

(AD-A109025; TR-16) Avail: NTIS HC A02/MF A01 CSCL 20/5

The synergistic effects of an adspecies/surface system influenced by a coherent laser field and an incoherent thermal phonon field are theoretically investigated. A generalized master equation is derived in the Schrodinger-Markoff picture and the total stimulated transition rates are decomposed into three parts: thermal phonon, laser and the interference terms. The energy transfer dynamics is pictured via the evolution equation of the average excitation of the active mode. A random phase of the off-diagonal matrix elements induced by the laser-stimulated surface processes is introduced. Finally, possible applications of the laser/phonon-stimulated master equation are discussed.

Author (GRA)

N82-19532# Saint Louis Univ., Mo. Dept. of Physics.

CATOPTRIC X-RAY OPTICAL SYSTEM FOR USE IN LASER-FUSION DIAGNOSTICS Annual Technical Report, 1 Oct. 1980 - 30 Sep. 1981

James F. McGee 30 Nov. 1981 20 p refs

(Grant AF-AFOSR-3480-78; AF Proj. 2301)

(AD-A109037; AFOSR-81-0865TR) Avail: NTIS HC A02/MF A01 CSCL 14/2

A compound X-ray imaging device was developed as an aid in the diagnostics of a laser-fusion process which involves a pellet about 100 microns in diameter. While previous reports have dealt with the use of certain aspheric surfaces in the X-ray imaging process, this report is confined to a thorough investigation of the use of Abbe's sine condition at grazing angles of incidence in the case of a single reflector. Author (GRA)

N82-19533# Philips Labs., Briarcliff Manor, New York.

DEVELOPMENT OF A NOVEL LASER MATERIAL FOR MINIATURIZED LASER SYSTEMS Quarterly Technical Report, 1 Jul. - 30 Sep. 1981

Walter K. Zwicker, Sel Colak, and Jacob Khurgin Nov. 1981 28 p refs
(Contract MDA903-81-C-0034; DARPA Order 4040)
(AD-A109129; QTR-4) Avail: NTIS HC A03/MF A01 CSCL 20/5

Our work during this quarter dealt with the growth and evaluation of NPP crystals for a 1.06 micrometer miniature laser and Er(3+) stoichiometric crystals for an eyesafe miniature laser emitting at 1.54 micrometer. Crystals of NPP up to 2x2x20 mm for fabrication of miniature laser rods were grown by a previously described high-temperature, solution-growth technique. Flash-lamp-pumped lasing experiments were conducted using various sizes of NPP crystals, in both the free-oscillation and Q-switched modes at different pulse repetition rates. Output pulse energies and properties of the laser output beam were measured. The efficiencies for the free-oscillation mode were close to the maximum published values; for the Q-switched mode, the efficiencies were low compared to published values. Crystals of ErP5O14 were grown by the same technique used for NPP; crystals of ErLiP4O12 and ErAl3(BO3)4 were grown by related fluxed-melt techniques. These crystals were several millimeters in size. Both Yb and Gd were added in various ratios as sensitizing and/or diluent ions. the absorption and emission properties of the Er3+ luminescence in some samples of ErP5O14, LiErP4O12, and ErAl3(BO3)4 have been studied both in the visible and infrared regions of the spectrum. Preliminary evaluations of these materials for laser applications have been made. GRA

N82-19534# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Kreiselgeraete und Traegheitsortung.
ELECTRONICS FOR DATA ACQUISITION OF LASER GYROSCOPE MEASUREMENTS
Friedrich Posnien Apr. 1981 54 p refs In GERMAN; ENGLISH summary
(Contract BWB-E/F-51-E/90001/85484)
(DFVLR-Mitt-81-16) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 15

The electronics for a signal readout system for laser gyroscopes are described. In the analog part of the readout electronics, a single beam readout method was used, enhancing the signal to noise ratio as compared to the interference stripe pattern. Two digital methods for identifying the lock-in-gap and for steering the output counter were investigated. The first is based on identification by monostable multivibrators, the second on identification by a digital comparator. Author (ESA)

N82-19535# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
LASER JOURNAL (SELECTED ARTICLES)
6 Nov. 1981 31 p refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 5-9, 17-20, 47-49, 56-57 (AD-A108173; FTD-ID(RS)T-0861-81) Avail: NTIS HC A03/MF A01 CSCL 20/5

Properties of steady discharge in Ar-Kr-F2 gas mixtures are discussed. Experimental investigations of uv-preionized ArF and KrF eximer lasers are reported. Nd: yag pulsed laser output at various infrared singlet spectral lines are examined. A feedback controlled stabilized power supply for gas lasers is reported. For individual titles, see N82-19536 through N82-19539.

N82-19536# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PROPERTIES OF STEADY DISCHARGE IN Ar-Kr-F2 GAS MIXTURE
Zheng Chengen *In its* Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 1-11 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 5-9 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Some properties of Ar-Kr-F2 laser gas mixture plasma under steady discharge conditions are computed and discussed. Both the excitation rate of the discharging electrons and the distribution of the discharge energy are discussed. The effects of fluoride gas content and impurity gas content on the discharge property are studied. B.W.

N82-19537# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
UV-PREIONIZED ArF AND KrF EXCIMER LASERS
Shangguan Cheng, Yuan Cailai, and Ye Chao Dou Alrong *In its* Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 12-19 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 17-20 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Experimental investigations of UV-preionized ArF and KrF excimer lasers are reported. The output laser energies of 105 mJ for ArF and 185 mJ for KrF are obtained. Effects of various parameters on the laser characteristics are discussed. Author

N82-19538# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
Nd:YAG PULSED LASER OUTPUT AT 1.064, 1.073, 1.061 AND 1.052 MICROMETERS SINGLET SPECTRAL LINES
In its Laser J. (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 20-24 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 47-49 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

Single spectral lines at 1.064, 1.073, 1.061, and 1.052 micron were obtained respectively by inserting into the cavity the uncoated (or coated) solid etalons of 0.1 mm or both 0.1 mm and 0.14 mm thickness and appropriately controlling the gain of Nd:YAG laser and tilted angles of the etalons. An output cavity mirror which has different reflectivities for different wavelengths was also developed. B.W.

N82-19539# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A NEW FEEDBACK CONTROLLED CURRENT STABILIZED POWER SUPPLY FOR GAS LASER
In its Laser (Selected Articles) (FTD-ID(RS)T-0861-81) 6 Nov. 1981 p 25-27 refs Transl. into ENGLISH from Laser Journal (China), v. 8, no. 2, 1981 p 56-57 (For primary document see N82-19535 10-36)
Avail: NTIS HC A03/MF A01 CSCL 20/5

A feedback controlled current stabilized power supply for CO2, wave guide lasers is reported. This current negative feedback control method involved connecting the control transistor to the DC output and of an AC bridge rectifier. Current is stabilized in the range of 2 to approximately 4 mW, the unstability of the current is less than 1% with respect to 20% fluctuation of network voltage. The principal circuit and the voltage-current wave forms of the power supply are shown. B.W.

N82-20041*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
PLASMA LASERS (A STRONG SOURCE OF COHERENT RADIATION IN ASTROPHYSICS)
K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 89-95 refs (For primary document see N82-20030 10-88)
(Contracts NAGw-81; N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20E

N82-20118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEVELOPMENT OF A MAGNETICALLY ENHANCED HYDROGEN GAS DISSOCIATION
L. Maleki and T. K. Tucker *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 24-28 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

N82-20119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAGNETIC REFRIGERATION FOR MASER AMPLIFIER COOLING
D. L. Johnson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 29-38 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-19540* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPOSITE SEAL FOR TURBOMACHINERY Patent
Robert C. Bill and Lawrence P. Ludwig, inventors (to NASA) Issued 20 Oct. 1981 5 p Filed 20 Nov. 1979 Division of US Patent Appl. SN-931090, filed 8 Aug. 1978, US Patent-4,207,024 which is a division of US Patent Appl. SN-810290, filed 27 Mar. 1977, US Patent-4,135,851
(NASA-Case-LEW-12131-3; US-Patent-4,295,786; US-Patent-4,207,024; US-Patent-4,135,851; US-Patent-Appl-SN-096255; US-Patent-Appl-SN-931090; US-Patent-Appl-SN-801290; US-Patent-Class-415-174; US-Patent-Class-415-196) Avail: US Patent and Trademark Office CSCL 11A

A gas path seal suitable for use with a turbine engine or compressor is provided. A shroud wearable or abradable by the abrasion of the rotor blades of the turbine or compressor shrouds the rotor blades. A compliant backing surrounds the shroud. The backing is a yieldingly deformable porous material covered with a thin ductile layer. A mounting fixture surrounds the backing.

Official Gazette of the U.S. Patent and Trademark Office

N82-19541 British Aerospace Dynamics Group, Bristol (England).
LIFE-SIZE QUANTITATIVE TESTS ON A SIMPLE COUNTERSPUN FLYWHEEL NUTATION DAMPER
S. W. Tonkin and W. J. Shackcloth 1980 60 p refs
(BAe-NUTDAM-11) Avail: Issuing Activity

A nonactive nutation damper for use on single-spin spacecraft is considered. A test rig and damper calibration table were constructed. Suitable instrumentation and measurement techniques were developed. The damper was integrated into the test rig and a series of tests were completed. The damper is shown to be effective. However, further modifications are required on both damper and test techniques before a commercial damper can be marketed; these are discussed. Author (ESA)

N82-19542*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 1: STATUS OF OTTO CYCLE ENGINE TECHNOLOGY
M. W. Dowdy 15 Dec. 1981 216 p refs
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168643; JPL-Pub-81-65-Vol-1; DOE/CS-50194/1)
Avail: NTIS HC A10/MF A01 CSCL 21A

Federally-mandated emissions standards have led to major changes in automotive technology during the last decade. Efforts to satisfy the new standards were directed more toward the use of add-on devices, such as catalytic converters, turbochargers, and improved fuel metering, than toward complete engine redesign. The resulting changes are described and the improvement brought about by them in fuel economy and emissions levels are fully documented. Four specific categories of gasoline-powered internal combustion engines are covered, including subsystem and total engine development. Also included are the results of fuel economy and exhaust emissions tests performed on representative vehicles from each category. Author

N82-19543*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 2: STATUS OF DIESEL ENGINE TECHNOLOGY
H. W. Schneider 15 Dec. 1981 191 p refs
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168644; JPL-Pub-81-65-Vol-2; DOE/CS-50194/1)
Avail: NTIS HC A09/MF A01 CSCL 21A

The engines of diesel cars marketed in the United States were examined. Prominent design features, performance characteristics, fuel economy and emissions data were compared. Specific problems, in particular those of NO and smoke emissions, the effects of increasing dieselization on diesel fuel price and availability, current R&D work and advanced diesel concepts are discussed. Diesel cars currently have a fuel economy advantage over gasoline engine powered cars. Diesel drawbacks (noise and odor) were reduced to a less objectionable level. An equivalent gasoline engine driveability was obtained with turbocharging. Diesel manufacturers see a growth in the diesel market for the next ten years. Uncertainties regarding future emission regulation may inhibit future diesel production investments. With spark ignition engine technology advancing in the direction of high compression ratios, the fuel economy advantages of the diesel car is expected to diminish. To return its fuel economy lead, the diesel's potential for future improvement must be used.

Author

N82-19544*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONVENTIONAL ENGINE TECHNOLOGY. VOLUME 3: COMPARISONS AND FUTURE POTENTIAL
M. W. Dowdy 15 Dec. 1981 32 p ref
(Contracts NAS7-100; DE-AI01-80CS-50194)
(NASA-CR-168645; JPL-Pub-81-Vol-3; DOE/CS-50194/1)
Avail: NTIS HC A03/MF A01 CSCL 21A

The status of five conventional automobile engine technologies was assessed and the future potential for increasing fuel economy and reducing exhaust emission was discussed, using the 1980 EPA California emisions standards as a comparative basis. By 1986, the fuel economy of a uniform charge Otto engine with a three-way catalyst is expected to increase 10%, while vehicles with lean burn (fast burn) engines should show a 20% fuel economy increase. Although vehicles with stratified-charge engines and rotary engines are expected to improve, their fuel economy will remain inferior to the other engine types. When adequate NO emissions control methods are implemented to meet the EPA requirements, vehicles with prechamber diesel engines are expected to yield a fuel economy advantage of about 15%. While successful introduction of direct injection diesel engine technology will provide a fuel savings of 30 to 35%, the planned regulation of exhaust particulates could seriously hinder this technology, because it is expected that only the smallest diesel engine vehicles could meet the proposed particulate requirements. A.R.H.

N82-19545# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
PERFORMANCE OF INDUSTRIAL-TYPE ENGINES IN MILITARY EQUIPMENT USING SYNTHETIC CRANKCASE OILS Final Report
Gene H. Austin, Thomas Bowen, Lewis Cheek, and Basil Zanedis Jun. 1981 187 p ref
(AD-A109023; MERADCOM-2326) Avail: NTIS HC A09/MF A01 CSCL 11/8

The investigation was to determine the possibility of eliminating crankcase oil changes in engines used in Military equipment. Based on the results, it appears that an extended oil change interval can be used which would result in significant savings. Author (GRA)

N82-19546# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
TUBE TO TUBESHEET WELDING BY ELECTRON BEAM FOR HEAT EXCHANGER APPLICATION
F. Noller and H. G. Mayer Jun. 1981 116 p refs In GERMAN; ENGLISH summary
(IKE-1-11; ISSN-0173-6892) Avail: NTIS HC A06/MF A01

The importance of tube to tubesheet welding and the choice of materials, by electron beam (EB) application, in the construction of steam generators was examined. The EB process was used to weld tubes into tubesheets even with materials sensitive to hot cracking. The range of qualified welding parameters is evaluated. A microcomputer controlled welding cycle using beam deflection, automatic seam tracking, beam current and focus control, is recommended. Results are adapted to specific conditions of mobile welding equipment with localized vacuums.

Transl. by E.A.K.

N82-19547# National Centre of Tribology, Risley (England).
SELECTED EUROPEAN SPACE TRIBOLOGY LABORATORY (ESTL) PAPERS ON BALL BEARINGS FOR SATELLITES
M. J. Todd, K. T. Stevens, and E. J. Robbins Paris ESA Sep.

1980 98 p refs Sponsored by ESA
(ESA-TRIB-1; ISSN-0250-4448) Avail: NTIS HC A05/MF A01

Thin lead film lubricants, radial thermal conductance, torque, and cage instabilities are discussed. A lead plating method with improved adhesion torque, and wear characteristics is presented. The effect of bearing size, load, speed, and lubricant on thermal conductance in vacuum is examined. A model which predicts frictional torque is assessed. The torque of ball bearings moving over very small angles, of relevance to attitude control and pointing, is treated. For individual titles, see N82-19548 through N82-19548.

N82-19548# National Centre of Tribology, Risley (England).
ION-PLATED LEAD AS A FILM LUBRICANT FOR BEARINGS IN VACUUM
M. J. Todd and E. J. Robbins *In its* Selected ESTL Papers on Ball Bearings for Satellites Sep. 1980 p 1-13 refs Sponsored by ESA (For primary document see N82-19547 10-37)
Avail: NTIS HC A05/MF A01

A space qualified technique which produces adherent, good quality lead films on the raceways of ball bearings is described. After argon ion sputter cleaning, the lead is evaporated into a glow discharge maintained in an inert gas, usually argon. The atoms of vapor, some of which become ionized, then bombard a target cathode holding the specimens to be plated. The deposition rate during plating must exceed sputtering rate. Six pairs of ion plated bearings were torque tested at 2 million revolutions per pair, at low speed. The average torque is 0.002 Nm, well within the 0.028 Nm preset trip level. Steel wear is restricted to very mild pitting. Debris worn from the lead-bronze cage still represents the major source of torque noise, despite the large reduction in debris compared with vacuum-evaporated films. A lead-containing cage with a very much lower wear rate of the supporting matrix is needed for medium and high speed use. Author (ESA)

N82-19549# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).
THE SUSPENSION SYSTEM OF THE CRYOGENIC GRAVITATIONAL ANTENNA OF THE ISTITUTO PLASMA SPAZIO [SISTEMA DI SOSPENSIONE DELL'ANTENNA GRAVITAZIONALE CRIOGENICA DEL'I.P.S.]
E. Coccia (Rome Univ.) and V. Iafolla Oct. 1981 35 p refs In ITALIAN
(IPS-81-14) Avail: NTIS HC A03/MF A01

The design of a two stage suspension system for a gravitational antenna is described. The antenna weighs 5 t and works in liquid helium, pumped at 4.2 K. The signals to be detected, mainly from supernova sources, are energy fluxes on the order of 0.0001 erg/cm sq. The amplitudes, induced in the fundamental vibration mode at 1796 Hz, are about 10 to the -18th power cm. The mechanical attenuation system was designed with a 3 Hz resonant frequency and 100 dB attenuation for the first stage and a 30 Hz frequency and 70 dB attenuation for the second stage. The measured value of attenuation is 120 dB, which is deemed satisfactory although lower than the 150 dB design value. The possible causes of this attenuation loss are discussed. Author (ESA)

N82-19556# Newcastle-upon-Tyne Univ. (England). Dept. of Mechanical Engineering.
CHAIN AND BELT DRIVES, A REVIEW
J. N. Fawcett *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 5-12 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

N82-19559# Indian Inst. of Science, Bangalore. Dept. of Mechanical Engineering.
EVALUATION AND CONTROL OF THE EXHAUST NOISE OF RECIPROCATING I.C. ENGINES
M. L. Munjal *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 5-14 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-19550*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIENCE WITH MODIFIED AEROSPACE RELIABILITY AND QUALITY ASSURANCE METHOD FOR WIND TURBINES
William E. Klein 1982 11 p refs Proposed for Presentation at 9th Ann. Engr. Conf. on Reliability, Hershey, Penn., 16-18 Jun. 1982 Revised
(Contract DE-AI01-76ET-20320)
(NASA-TM-82803; DOE/NASA/20320-38; E-1142) Avail: NTIS HC A02/MF A01 CSCL 14D

The SR&QA approach assures that the machine is not hazardous to the public or operating personnel, can operate unattended on a utility grid, demonstrates reliability operation, and helps establish the quality assurance and maintainability requirements for future wind turbine projects. The approach consisted of modified failure modes and effects analysis (FMEA) during the design phase, minimal hardware inspection during parts fabrication, and three simple documents to control activities during machine construction and operation. Five years experience shows that this low cost approach works well enough that it should be considered by others for similar projects. T.M.

N82-19551# Mitre Corp., Bedford, Mass.
RIW WORKSHOP REPORT
Walter P. Crossley and Sidney A. Greenberg Hanscom AFB, Mass. Electronic Systems Div. Nov. 1981 56 p
(Contract F19628-82-C-0001; AF Proj. 5170)
(AD-A108798; MTR-8255; ESD-TR-81-257) Avail: NTIS HC A04/MF A01 CSCL 14/4

A reliability improvement warranty (RIW) workshop was convened on 9 to 10 December 1980 at the MITRE Corporation, Bedford, Mass., to explore the feasibility of RIW for current and future production JTIDS (Joint Tactical Information Distribution System) contracts. In particular, RIW suitability for the Class 1 JTIDS production buy was discussed. The concensus of the group was that RIW is not appropriate for the Class 1 production buy, but that it can be useful on other programs including Class 2 JTIDS if certain conditions are met and the RIW contract is tailored to the program. Author (GRA)

N82-19552# Grumman Aerospace Corp., Bethpage, N.Y.
TAPED RANDOM SPECTRA FOR RELIABILITY DEMONSTRATION TESTING Final Report, Oct. 1979 - Apr. 1981
Joseph J. Popolo, John G. Devitt, Richard OPokallus, and Noe Arcas Apr. 1981 211 p
(Contract N00019-77-C-0032)
(AD-A108803; RMS-81-R-1) Avail: NTIS HC A10/MF A01 CSCL 14/4

A study to develop an economical test technique for Reliability Demonstration tests in accordance with MIL-STD-781C was undertaken. This has been accomplished by developing two different methods: Multiplex System - incorporates a reel-to-reel tape recorder that generates the desired synthesized random spectrum on one channel while the other channel incorporates a control programmer; and Microprocessor System - incorporates a desk top computer that is programmed to initiate, monitor and control a Reliability Demonstration test. Included with this system is a 'sound-on-sound' tape cassette recorder to generate the synthesized random spectrum and a printer to record the control signals and monitor data during the test. Author (GRA)

N82-20125*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 2: MARKOV DECISION APPROACH
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 75-89 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

N82-20128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TIGER RELIABILITY ANALYSIS IN THE DSN
J. M. Gunn *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 112-120 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

N82-20130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE AND OPERATIONS TASKS ACCOMPLISHED AT DSS 12 DURING THE ANTENNA PANEL REPLACEMENT DOWNTIME
L. Butcher, T. Jonas, and W. Wood *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 127-128 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-19553 Alabama Univ. in Huntsville.
DYNAMICS OF A CHAIN OF FLEXIBLE BODIES Ph.D. Thesis
Ramendra P. Singh 1981 134 p
Avail: Univ. Microfilms Order No. 8128324

A mathematical modeling technique is developed for a space structure idealized as a collection of flexible bodies in a chain configuration. The methodology employed in the derivation does not require the presence of a rigid body in the chain. The contiguous bodies are permitted to undergo large relative rotations. The Lagrange's form of D'Alembert's principle is adopted to derive the equations of motion. The mathematical foundations of the quasicoordinates are explored an it is shown that they emerge naturally from a variational principle. A floating reference frame called the Tisserand frame or the mean axis frame is selected for the dynamic analysis. It is shown that the Tisserand frame follows the deformable body in an optimal manner. This frame has a well defined motion in an inertial reference frame and is suitable for use in conjunction with linear structural theory.
Dissert. Abstr.

N82-19554 Illinois Univ. at Urbana-Champaign.
NUMERICAL SIMULATION OF REINFORCED CONCRETE SUBJECTED TO MULTIAXIAL STRESS CONDITIONS Ph.D. Thesis
Eugene Yu-Tze Chen 1981 197 p
Avail: Univ. Microfilms Order No. 8127563

Reinforced concrete is by far one of the most commonly used construction materials. This composite material demonstrates a highly nonlinear behavior caused by cracking, crushing, aggregate interlock, bond slip, dowel action, shrinkage and creep. Because the reinfored concrete involves so many nonlinear phenomena interacting with one another, the formulation of a 'complete' analytical model is very difficult. The focus of this study is cast on: (1) three dimensional nonlinear constitutive relations and failure criterion for concrete subjected to short term monotonic loading; (2) crack modeling in concrete; (3) interface and stiffness transfer across the crack; and (4) finite element implementation of the findings into an integrated program. Comparison of numerical results with actual test results are presented to verify this proposed algorithm. Dissert. Abstr.

N82-19555# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 5 Monthly Report
Judith Nagle-Eshleman, ed. May 1981 129 p refs
(AD-A099477) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

The specific problems of chain drives and of belt drives are discussed. Methods for solving nonlinear stochastic problems in dynamics are presented including equivalent linearization, perturbation, functional series representation and simulation. Book reviews, seminars, and newsbriefs on related subjects are presented. A bibliography with abstracts is included. For individual titles, see N82-19556 through N82-19557.

N82-19556# Newcastle-upon-Tyne Univ. (England). Dept. of Mechanical Engineering.
CHAIN AND BELT DRIVES, A REVIEW **c37**
J. N. Fawcett *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 5-12 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

The specific problems of chain drives and of belt drives are discussed. The general problem of axially moving materials which is appropriate to the spans of both chain and belt drives is also discussed. Vibration, noise and pulley-belt interaction are examined. B.W.

N82-19557# Sussex Univ., Brighton (England). School of Engineering and Applied Sciences.
RESPONSE OF NONLINEAR MECHANICAL SYSTEMS TO RANDOM EXCITATION. PART 2: EQUIVALENT LINEARIZATION AND OTHER METHODS
J. B. Roberts *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 5 May 1981 p 15-29 refs (For primary document see N82-19555 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Methods for solving nonlinear stochastic problems in dynamics are discussed. Equivalent linearization, perturbation, functional series representation, and simulation are examined. B.W.

N82-19558# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 1 Monthly Report
Judith Nagle-Eshleman, ed. Jan. 1981 102 p refs
(AD-A095594) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Recent advances in the study of shock and vibration in mechanical systems are reviewed. Engine exhaust noise, vibration control with viscoelastic materials, and the vibrations and stability of mechanical systems are discussed. Book reviews on failure prevention and reliablity assurance, Lagrangian mechanics of nonconservative nonholonomic systems, and vibration measurement are included. A bibliography with abstracts is given. For individual titles, see N82-19559 through N82-19561.

N82-19559# Indian Inst. of Science, Bangalore. Dept. of Mechanical Engineering.
EVALUATION AND CONTROL OF THE EXHAUST NOISE OF RECIPROCATING I.C. ENGINES **c37**
M. L. Munjal *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 5-14 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Recent advances in the analysis, design, and testing of exhaust mufflers for reciprocating internal combustion engines are reviewed. An outline of specific areas needing further attention is given. R.J.F.

N82-19560# Indian Inst. of Tech., New Delhi. Dept. of Mechanical Engineering.
VIBRATION CONTROL WITH VISCOELASTIC MATERIALS, 2
B. C. Nakra *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 17-20 refs (For primary document see N82-19558 10-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Investigations dealing with vibration control using viscoelastic materials are reviewed. Specific topics include analysis of configurations, properties of the materials used, and applications. R.J.F.

N82-19561# Waterloo Univ. (Ontario). Dept. of Systems Design.

VIBRATIONS AND STABILITY OF MECHANICAL SYSTEMS: 2

K. Huseyin *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 1 Jan. 1981 p 21-29 refs (For primary document see N82-19558 10-39)

Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Developments in linear and nonlinear theories for studying the vibrational and stability behavior of autonomous systems under the influence of several independent parameters are described. Four classes of systems are identified for linear theories: conservative, pseudo-conservative, gyroscopic, and circulatory. Nonlinear theories involve both gradient and nongradient systems. R.J.F.

N82-19562 Shock and Vibration Information Center (Defense), Washington, D. C.

THE SHOCK AND VIBRATION DIGEST, VOLUME 13, NO. 12 Monthly Report

Judith Nagle-Eshleman, ed. Dec. 1981 178 p refs

(AD-A109583) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

A literature review of finite element modeling of fiber reinforced composite plates and shells and a discussion of unsteady forces and flow phenomena resulting from vortex shedding from circular and noncircular cylinders are presented. For individual titles, see N82-19563 through N82-19564.

N82-19563*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.

FINITE-ELEMENT MODELING OF LAYERED, ANISOTROPIC COMPOSITE PLATES AND SHELLS: A REVIEW OF RECENT RESEARCH

J. N. Reddy *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 3-12 refs (For primary document see N82-19562 10-39)

(Grants NAG3-208; AF-AFOSR-0142-81)

Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

Finite element papers published in the open literature on the static bending and free vibration of layered, anisotropic, and composite plates and shells are reviewed. A literature review of large-deflection bending and large-amplitude free oscillations of layered composite plates and shells is also presented. Non-finite element literature is cited for continuity of the discussion. J.D.H.

N82-19564# Shock and Vibration Information Center (Defense), Washington, D. C.

VORTEX SHEDDING FROM CYLINDERS AND THE RESULTING UNSTEADY FORCES AND FLOW PHENOMENA, PART 2 **c34**

S. T. Fleischmann and D. W. Sallet (Maryland Univ., College Park) *In its* The Shock and Vibration Digest, Vol. 13, No. 12 Dec. 1981 p 15-24 refs (For primary document see N82-19562 10-39)

Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $15.00/set CSCL 20/11

An extensive review of the unsteady flow phenomena that occur on and near cylinders in cross flow and that are related to vortex shedding is presented. Vortex shedding from non-circular cylinders and the topic of cylinders undergoing flow-induced vibration are introduced. Experimental values of the unsteady lift and drag coefficients and experimental values of the Strouhal number for circular cylinders over a wide range of Reynolds numbers obtained from numerous investigators are presented. J.D.H.

N82-19565 Defence Research Information Centre, Orpington (England).

PELLINI'S THEORY OF BRITTLE FRACTURE AND THE LIMITS OF ITS APPLICABILITY

K. Fromm and H. D. Schulze Oct. 1981 18 p refs Transl. into ENGLISH of Schneiden, (West Germany) v. 32, no. 10, 1980 p 416-420

(DRIC-T-6468; BR81312) Copyright. Avail: Issuing Activity

The development of Pellini's theory of brittle fracture is described. The correlation of the results of many cases of damage, and of extensive tests on components and large plates, with this theory led to the development of the fracture analysis diagram. The ability to apply the NDT temperature to the behavior of components explains the significance of the drop weight test in comparison with other strength testing methods. Problems in determining the NDT temperature are pointed out, e.g. the effect of notch shape on brittleness. Using the example of the failure behavior of cylindrical shots and pipes, the limits of the theory are shown: it does not account for system energy content, or impact strength. The failure behavior of these components does not however contradict theory. Author (ESA)

N82-19566*# Iowa Univ., Iowa City. Div. of Materials Engineering.

INVESTIGATION OF CREEP BY USE OF CLOSED LOOP SERVO-HYDRAULIC TEST SYSTEM

Han C. Wu and J. C. Yao 20 Nov. 1981 44 p refs

(Contract NsG-1499)

(NASA-CR-168613; G302-81-001) Avail: NTIS HC A03/MF A01 CSCL 20K

Creep tests were conducted by means of a closed loop servo-controlled materials test system. These tests are different from the conventional creep tests in that the strain history prior to creep may be carefully monitored. Tests were performed for aluminum alloy 6061-0 at 150 C and monitored by a PDP 11/04 minicomputer at a preset constant plastic-strain rate prehistory. The results show that the plastic-strain rate prior to creep plays a significant role in creep behavior. The endochronic theory of viscoplasticity was applied to describe the observed creep curves. The concepts of intrinsic time and strain rate sensitivity function are employed and modified according to the present observation. Author

N82-19567# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Aeronautics.

LARGE SCALE DYNAMICS OF LONG FLEXIBLE CABLES TOWED THROUGH AIR

Lasse K. Karlsen 1981 32 p refs

(KTH-Aero-TN-61) Avail: NTIS HC A03/MF A01

The full nonlinear equations of motion of a flexible cable in air are formulated together with the appropriate initial and boundary conditions at the cable ends. The properties of transverse waves are studied using a linearized amplitude equation. Numerical computations are carried out on the complete equations for the large scale motion. The longitudinal elastic equation is replaced by an inextensibility condition and a modified equation for the cable tensile force. Some typical cases of targets towed by an aircraft are considered. The response is computed for aircraft maneuvers such as acceleration - deceleration, climb - descent, and 180 deg. turns with short and long cables. S.L.

N82-19568# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.

FATIGUE OF 2024-T351 AND 7075-T7351 Al-ALLOY LUGS WITH AND WITHOUT INTERFERENCE FIT UNDER MANEUVER SPECTRUM LOADING

A. Buch and A. Bercovits Apr. 1981 39 p refs

(TAE-440) Avail: NTIS HC A03/MF A01

Aircraft pin-lug joints with and without interference fit were tested under maneuver loading programs with random loading sequence. The effect of design load, lug material and interference fit on the spectrum fatigue life was investigated. The interference fit of 0.3% had a strong beneficial effect on the fatigue life for all loading programs, even when local tensile stress peaks exceeded the material yield stress. The spectrum fatigue life of 2024-T351 lug specimens was longer than that of 7075-T7351 specimens, with the exception of interference fit lugs at the highest design load. Test results are presented and compared with predictions based on Miner's Rule, the Relative Miner Rule, and a notch analysis method. A.R.H.

N82-19569# Illinois Univ., Urbana. Dept. of Mathematics.

AN IMPROVED SCHEME TO DEVELOP MULTIDIMENSIONAL GENERALIZED YIELD AND FAILURE SURFACES FOR STRUCTURAL ELEMENTS

Margaret Cheney and Thomas A. Duffey (New Mexico Univ., Albuquerque) Apr. 1981 32 p refs

(Contract W-7405-eng-36)
(LA-8728-MS) Avail: NTIS HC A03/MF A01

Two dimensional convex generalized yield and failure curves for structural elements are combined to form lower bound, higher dimensional interaction surfaces. These higher dimensional surfaces are useful for predicting yielding or failure of structural elements when subjected to several simultaneously interacting generalized stresses at a given cross section. The geometrical version of the Hahn-Banach theorem, and Lagrange multipliers are used. Each method is illustrated by three and six dimensional examples, and the degree of conservatism of each is evaluated by comparison to exact multidimensional interaction surfaces. S.L.

N82-19570# National Aerospace Lab., Tokyo (Japan).
ACOUSTIC FATIGUE ENDURANCE TEST OF USB FLAP STRUCTURE MODELS AT ELEVATED TEMPERATURE
Masaaki Sano, Yoshinori Fukimori, Soushiro Iida, Keiji Komatsu, and Koichi Egawa Oct. 1981 59 p refs In JAPANESE; ENGLISH summary
(NAL-TR-683) Avail: NTIS HC A04/MF A01

Five substructural models of upper surface blown flaps were tested to verify the safety of the flap structure during a planned flight evaluation of the NAL-STOL experimental aircraft. All models consisted of the face panel with stringers and ribs rivetted on the backside in shape. Four panels were flat; one had the same curvature as the actual flap structure. Three face panels and stiffeners were of Ti-6Al-4V the others were of 2024C-T3 alloy. Results of thermal buckling tests, resonant frequencies of all panels, the dynamic and the measurement of dynamic strain response are discussed. All structural models proved strong enough to resist both acoustic and thermal loading. No detectable damage was found on the panel face nor around the rivet holes. Estimated lives based on simulated and experimental strain histories suggest confirmation of the fatigue test results. A.R.H.

N82-19571# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.
PRACTICAL APPLICATIONS OF FRACTURE MECHANICS
Harold Liebowitz, ed. (George Washington Univ.) May 1980 425 p refs
(AGARD-AG-257; ISBN-92-835-1359-2) Avail: NTIS HC A16/MF A01

Practical applications of fracture mechanics for all aspects of aircraft design, manufacture and testing are presented. Although theoretical discussions are included to provide an appreciation of the complexity of the problems involved, the emphasis is on practical examples. Applications to engine components; built-up structures; joints, lugs and fasteners; integral structures and forgings are covered. The effects of stress corrosion and problems of scatter affecting determination of stress concentration factors, fatigue crack propagation and residual strength are discussed. S.L.

N82-19572# Puerto Rico Univ., Mayaguez. Dept. of Civil Engineering.
IMPLEMENTATION OF A POSTCRACKING MODEL FOR FINITE ELEMENT ANALYSIS OF REINFORCED CONCRETE Final Report, 1 Feb. - 31 Jul. 1981
Rafael Jimenez-Perez Sep. 1981 66 p refs
(Grant AF-AFOSR-0092-81; AF Proj. 2307)
(AD-A108984; AFOSR-81-0868TR) Avail: NTIS HC A04/MF A01 CSCL 11/2

A computer code was developed to model the nonlinear response of reinforced concrete elements subjected to plane strain, plane stress or axisymmetric loading conditions. The material subroutine includes the following sources of nonlinear behavior: (a) Nonlinear stress strain curve for concrete as represented by the endochronic model; (b) stress-strain curve for the reinforcement including the elastic, plastic and strain hardening stages; (c) concrete anisotropy caused by complex stress states and cracking; and (d) the postcracking shear transfer mechanisms. The computer code was checked with a very limited amount of experimental data for plain concrete and for an initially cracked reinforced concrete panel subjected to biaxial stress states. In general, the code predicts results that agree satisfactorily with the experimental data but needs to be further checked against additional test cases. GRA

N82-19573# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
THE ROLE OF ENVIRONMENT ON TIME DEPENDENT CRACK GROWTH
R. E. Ricker and D. J. Duquette Dec. 1981 22 p refs
(Contracts N00014-67-A-0117-0012; N00014-75-C-0466; NR Proj. 036-093)
(AD-A109388) Avail: NTIS HC A02/MF A01 CSCL 11/6

Gaseous as well as aqueous environments are known to accelerate time dependent crack growth under either static loading (SCC or HE) or dynamic loading conditions. In some cases, the rate controlling processes of these phenomena have been related to surface controlled reactions, while in other cases bulk reactions such as diffusion appear to be rate limiting. It is not entirely clear that the mechanisms of time dependent crack growth are identical for different environment/alloy couples, or for different ranges of loading conditions. This paper will attempt to examine the chemical aspects of environment/alloy interactions and to correlate those aspects with observed crack propagation rates under a variety of loading conditions at or near room temperature. Additionally, a brief discussion of the role of environment on elevated temperature fatigue crack growth will be presented. Author (GRA)

N82-19574# Stanford Univ., Calif. Div. of Applied Mechanics.
THE VALUE OF DYNAMIC FRACTURE TOUGHNESS AND ITS DEPENDENCE ON MATERIAL PROPERTIES AND LOADING CONDITIONS Final Report
George Herrmann Dec. 1981 6 p
(Grant DAAG29-78-G-0086)
(AD-A109151; ARO-14932.8-E) Avail: NTIS HC A02/MF A01 CSCL 13/13

Investigation of dynamic fracture of long brittle beams under different loading conditions was effected under ARO Grant DAAG29-78-G-0086. The work has proceeded in two distinct areas - the numerical solution of crack propagation problems using a finite difference code and the analytical solution of some beam fracture problems using several one dimensional theory formulations. Author (GRA)

N82-19575# Battelle Columbus Labs., Ohio.
THE DEVELOPMENT OF A DYNAMIC ELASTOPLASTIC FINITE ELEMENT ANALYSIS FOR FAST FRACTURE UNDER IMPACT LOADING Interim Report
Jalees Ahmad, J. Jung, C. R. Barnes, and M. F. Kanninen Jun. 1981 29 p refs Presented at ASME/PVP Conf., Denver, 22-25 Jun. 1981
(Contract N00014-77-C0576)
(AD-A109323) Avail: NTIS HC A03/MF A01 CSCL 20/11

Recent evidence has pointed to the possible inadequacy of elastodynamic treatments of rapid crack propagation and crack arrest. This paper describes the development of a dynamic elastic-plastic finite element capability designed to address this concern by taking direct account of crack tip plasticity. Comparisons with known dynamic fracture mechanics solutions and with experimental data are made to demonstrate the fidelity of the approach. A comparison with an elastodynamic solution in an impact loaded 4340 steel bend specimen is also made. This result reveals that a significant effect of crack tip plasticity may exist even for high strength materials. Author (GRA)

N82-19576# Battelle Columbus Labs., Ohio.
FINITE ELEMENT ANALYSIS OF DYNAMIC CRACK PROPAGATION Interim Report
J. Jung, Jalees Ahmad, M. F. Kanninen, and C. H. Popelar (Ohio State Univ., Columbus) Mar. 1981 24 p refs Presented at the Failure Prevention and Reliability Conf., Hartford, Conn., 20-23 Sep. 1981
(Contract N00014-77-C-0576)
(AD-A109322) Avail: NTIS HC A02/MF A01 CSCL 20/11

A finite element analysis of stationary and propagating cracks in the presence of inertia forces is presented. An extension of the J-integral approach is employed. To model a propagating crack, a conceptually simple yet effective technique has been

developed. The new crack propagation scheme eliminates the difficulties associated with the use of moving singular elements. Author (GRA)

N82-19577# Battelle Columbus Labs., Ohio.
THE NUMERICAL SIMULATION OF CRACK GROWTH IN WELD-INDUCED RESIDUAL STRESS FIELDS Interim Report
M. F. Kanninen, F. W. Brust, Jalees Ahmad, and I. S. Abou-Sayed Jul. 1981 25 p refs Presented at 28th Army Sagamore Res. Conf., Lake Placid, N.Y., 13-17 Jul. 1981
(Contract N00014-77-C-0516)
(AD-A109321) Avail: NTIS HC A02/MF A01 CSCL 20/11

A marriage of elastic plastic fracture mechanics techniques with thermoplastic finite element analyses is developed to examine crack growth in the presence of weld-induced residual stresses. A hypothetical crack growth relation based on the crack tip opening displacement is used. Three problem areas are studied: stress corrosion cracking in a girth-welded pipe, fatigue crack growth under cyclic loading in a butt-welded plate, and dynamic crack propagation under impact loading in a butt-welded plate. Comparisons with computations carried out under conventional linear elastic assumptions are made. It is found that, in all three cases, neglect of the plastic deformation caused by the welding process appears to be anti-conservative. It is concluded that more realistic computations for crack growth in and around welds than are commonly used may be needed for realistic structural integrity assessments. Author (GRA)

N82-19578# Boeing Aerospace Co., Seattle, Wash.
PROGRAM FOR NONLINEAR STRUCTURAL ANALYSIS Final Report, Jan. 1979 - Jun. 1981
Robert E. Jones Sep. 1981 77 p refs
(Contract F49620-79-C-0057; AF Proj. 2307)
(AD-A108975; AFOSR-81-0842TR) Avail: NTIS HC A05/MF A01 CSCL 13/13

The development and evaluation of new theoretical and numerical approaches for strongly nonlinear finite element analysis are reported. The element technology uses interior nodes to create higher order in-plane displacement forms needed for nonlinear strain calculation. Several solution procedure types are discussed, based on an updated total Lagrangian formulation. Progress with this approach and current capability levels are discussed. Author (GRA)

N82-19579# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
THERMO-ELASTIC-PLASTIC STRESSES IN MULTILAYERED CYLINDERS
John D. Vasilakis Nov. 1981 32 p refs Presented at 27th Conf. of Army Math., West Point, N.Y., 10-12 Jun. 1981
(DA Proj. 1T1-61101-A-91A)
(AD-A109320; ARLCB-TR-81044) Avail: NTIS HC A03/MF A01 CSCL 19/6

One of the many efforts undertaken to increase the life of gun tubes and/or increase their resistance to erosion involves the use of linears fabricated from different materials. A finite difference computer code for investigating the thermo-elastic-plastic response of gun tubes has been expanded to include multi-layered cylinder response to time dependent boundary conditions. Considered are both cyclic heat input and cyclic stress input. Response curves from inputs representative of repeated firing cycles are presented. The emphasis in this report is on the transient temperature response and on the thermo-elastic stresses and mechanical stresses in the layers. Author (GRA)

N82-19580# Army Materials and Mechanics Research Center, Watertown, Mass. Mechanics of Materials Div.
STRESS INTENSITY AND FATIGUE CRACK GROWTH IN MULTIPLY-CRACKED, PRESSURIZED, PARTIALLY AUTO-FRETTAGED THICK CYLINDERS Final Report
Anthony P. Parker (Royal Military College of Science) Aug. 1981 20 p refs
(DA Proj. 1L1-620105-AH-84)
(AD-A109081; AMMRC-TR-81-37) Avail: NTIS HC A02/MF A01 CSCL 19/6

Stress intensity factors are determined for internally and externally cracked, pressurized thick cylinders with partial autofrettage (less than 100% overstrain). The solutions are based on a superposition of existing solutions which does not involve any loss of accuracy. Implications of the stress intensity factor results for the safe-life design of gun tubes are discussed. Various suggestions for future work are presented. Author (GRA)

N82-19581# R and D Associates, Marina Del Rey, Calif.
STRESS PULSED REFLECTION AND TENSILE CRACKING IN A ONE-DIMENSIONAL BILINEAR MATERIAL Report, 1 Nov. 1979 - 31 Dec. 1980
D. A. Simons 31 Dec. 1980 42 p
(Contract DNA001-80-C-0069; DNA Proj. P99-QAXD)
(AD-A108833; RDA-TR-113206-005; DNA-5738T) Avail: NTIS HC A03/MF A01 CSCL 12/1

As a check case for numerical studies of tensile cracking in nonlinear media, closed form solutions have been derived for the following problems. A finite slab of bilinear material is loaded on one face by a sharp-fronted triangular pressure pulse. Cracks are assumed to form in the first case when the stress exceeds a tensile limit for a finite time, i.e., the tensile impulse is finite. In both cases the stress reaches the tensile limit and a first crack forms shortly after the incident wavefront reflects from the free face of the slab. In the first case a continuously cracked zone develops under the action of a tensile spike caused by the first crack. In the second case, the tensile spike has no effect on cracking, and a sequence of discrete cracks form. Stress histories and stress profiles are plotted for both cases. Author (GRA)

N82-19582# Systems Research Labs., Inc., Dayton, Ohio.
SURFACE-STRENGTHENING MECHANISMS IN REACTION-BONDED SiSUB3NSUB4 AND SUBCRITICAL-CRACK GROWTH BEHAVIOR IN CERAMICS Final Scientific Report, 1 Aug. 1977 - 30 Sep. 1981
M. G. Mendiratta Nov. 1981 79 p refs
(Contract F49620-77-C-0124; AF Proj. 2306)
(AD-A109087; SRL-6956; AFOSR-81-0863TR) Avail: NTIS HC A05/MF A01 CSCL 11/2

Investigations on: 1) strength and fracture toughness of oxidized, reaction-bonded (RB) Si3N4; 2) evaluation of chemical vapor deposition (CVD) coated reaction bonded Si3N4 and characterization of controlled nucleation thermochemical deposited (CNTD) silicon carbide 3) subcritical crack growth (SCG) behavior of hot pressed (HP) Si3N4 under mixed mode loading conditions and; SCG behavior of oxidized HP Si3N4; and 4) SCG behavior of Lithium-Aluminum Silicate (LAS) glass ceramics. The strength of HP Si3N4 under mixed mode loading conditions indicated that the effect of the shear component of applied stress is minimal and that the SCG mainly occurs in Mode 1. The preoxidation of HP Si3N4 decreased the SCG kinetics measurably SCG behavior of LAS glass ceramic also indicates that Mode 1 is the predominant mode of SCG. E.A.K.

N82-19583# Kaman Aerospace Corp., Bloomfield, Conn.
STRUCTURAL SYSTEM IDENTIFICATION TECHNOLOGY VERIFICATION Final Report
N. Giansante, A. Berman, W. G. Flannelly, and E. J. Nagy Ft. Eustis, Va. Army Research and Technology Labs. Nov. 1981 218 p refs
(Contract DAAK51-78-C-0017; DA Proj. 1L1-62209-AH-76)
(AD-A109181; R-1631; USAAVRADCOM-TR-81-D-28) Avail: NTIS HC A10/MF A01 CSCL 13/13

Structural system identification is the method of obtaining structural and dynamic mathematical models and improving existing mathematical models using ground vibration test data. The purpose of the subject program was to perform experimental, development, and research work to verify the concepts of structural system identification technology. To accomplish this, system identification techniques were applied to a U. S. Army AH-1G helicopter fuselage to create a mathematical model from ground vibration test data, to improve a reduced model of an existing NASTRAN model of the AH-1G using shake test data, and to test the effectiveness of these new mathematical models in predicting the effects of stiffness and mass changes to the airframe. The results of the program indicate that system identification is a viable and cost-effective technique for developing new models

and for improving existing finite-element models of an airframe using ground vibration test data. Author (GRA)

N82-19584# Lockheed Missiles and Space Co., Palo Alto, Calif.
UNDERWATER SHOCK ANALYSIS OF NONLINEAR STRUCTURES, A REFERENCE MANUAL FOR THE USA-STAGS CODE, VERSION 3 Final Report, 1 Mar. 1978 - 9 Dec. 1980
J. A. DeRuntz and F. A. Brogan 9 Dec. 1980 212 p refs
(Contract DNA001-78-C-0029; Q68QAXS)
(AD-A108911; LMSC-D779760; DNA-5545F) Avail: NTIS HC A10/MF A01 CSCL 20/11

This report is a reference manual for the third version of the USA-STAGS Code that calculates the nonlinear transient response of a totally or partially submerged structure to a spherical shock wave of arbitrary pressure profile and source location. USA-STAGS is the result of interfacing USA (Underwater Shock Analysis) and STAGS (Stress Analysis of General Shells). The fluid is assumed to be an infinite acoustic medium whose response to motions of the structure is described by either of the Doubly Asymptotic Approximations, DDA1 or DDA2. Author (GRA)

N82-19585# Technion - Israel Inst. of Tech., Haifa. Material Mechanics Lab.
TIME DEPENDENT INELASTIC BEHAVIOR OF MATERIALS Final Scientific Report, 1 Jul. 1980 - 30 Jun. 1981
Sol R. Bodner Jul. 1981 14 p Sponsored in part by the European Office of Aerospace Research and Development
(Grant AF-AFOSR-0214-80; AF Proj. 2307)
(AD-A109089; AFOSR-81-0855TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

A period of a research program was devoted to solving problems of the inelastic response of composite elements under dynamic loading, examining wave propagation in rate dependent inelastic media, and studying the creep response of metals. The reference material representation was taken to be the constitutive equations of Bodner-Partom for elastic-viscoplastic work-hardening materials. In particular, a theory for the dynamic behavior of laminated slabs of elastic-viscoplastic materials was developed. In addition, the constitutive equations were shown to provide realistic characterization of the time dependent inelastic behavior of metals ranging from creep to wave propagation conditions. Author (GRA)

N82-19586# Washington Univ., Seattle. Dept. of Mechanical Engineering.
FURTHER STUDIES ON DYNAMIC CRACK CURVING
Y. J. Sun, M. Ramulu, A. S. Kobayashi, and B. S.-J. Kang Nov. 1981 21 p refs
(Contract N00014-76-C-0060; NR Proj. 64-478)
(AD-A109299; TR-42) Avail: NTIS HC A02/MF A01 CSCL 20/11

The elastodynamic stress field surrounding rapidly propagating cracks in thin polycarbonate, double edged crack tension specimens were analyzed by dynamic photoelasticity using a 16 spark gap Cranz-Schardin camera system. Crack curving was observed in two slanted double edged crack specimens and in two offset parallel double edged crack specimens. In another test, the crack ran straight between two symmetrically located twin cracks. Results of these five tests were used to verify the dynamic crack curving criterion by Ramulu, et al., in which a reference distance from the crack tip is incorporated into the maximum circumferential stress of minimum strain energy density criteria. The critical material property for crack curving in this thin polycarbonate sheet was found to be about ro = 0.5 mm. GRA

N82-19587# Georgetown Univ., Washington, D.C. Dept. of Civil Mechanical and Environmental Engineering.
FRACTURE AND FATIGUE CHARACTERIZATION OF AIRCRAFT STRUCTURAL MATERIALS UNDER BIAXIAL LOADING Final Scientific Report, 1 Oct. 1976 - 30 May 1980
D. L. Jones and J. Eftis Dec. 1981 204 p refs
(Grant AF-AFOSR-3096-76; AF Proj. 2307)
(AD-A109054; AFOSR-81-0856TR) Avail: NTIS HC A10/MF A01 CSCL 01/3

A general fracture mechanics analysis was performed to examine the influence of biaxial applied loads on the mechanical state of the body. The geometries examined were the single crack and two coplanar cracks with an arbitrary orientation and the cracked shear panel. It was found that the biaxial loads influenced all aspects of the mechanical state of the body, with the exception of the stress intensity factor for a crack oriented parallel to the biaxial load. The extent and nature of the biaxial effect on the crack-tip stress field, stress intensity factor, angle of initial crack extension, crack-tip displacements, elastic strain energy, fracture load and fatigue crack growth rates are all discussed. A biaxial test facility was developed and a considerable number of photoelastic, fracture toughness, and fatigue crack growth rate experiments were performed. Confirmation of the analytical predictions was obtained for the biaxial effects on the crack-tip stress field, the angle of initial crack extension, the fracture load, and the fatigue crack growth rates. The biaxial loads were seen to influence all of these parameters in varying degrees. GRA

N82-19588# Lehigh Univ., Bethlehem, Pa. Inst. of Fracture and Solid Mechanics.
SURFACE REACTIONS AND FATIGUE CRACK GROWTH
R. P. Wei and G. W. Simmons Aug. 1981 20 p refs
(Contract N00014-75-C-0543; NR Proj. 036-097)
(AD-A109296; IFSM-81-107; TR-11) Avail: NTIS HC A02/MF A01 CSCL 20/11

Recent fracture mechanics and surface chemistry studies of environment assisted crack growth in gaseous environments have shown that crack growth may be controlled in some systems by the rate of surface reactions and in others by the rate of transport of the aggressive environment to the crack tip. Based on considerations of surface reactions and gas transport, a model for surface reaction and transport controlled fatigue crack growth in single component gaseous environments was proposed and experimentally verified. In practice, however, there is usually more than one gas in a given environment. The various component gases can compete for surface reaction sites and therefore alter the fatigue crack growth response. In this paper, the development of the model for surface reaction and transport controlled fatigue crack growth in single component gaseous environments is briefly reviewed. Modeling of fatigue crack growth in a binary gas mixture, in which one of the components acts as an inhibitor, is described, and the model is applied to the consideration of the influence of oxygen on fatigue crack growth in humid air. Author (GRA)

N82-19589# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
SURFACE MODIFICATION IN CONTROL SiO2 FIBER FRACTURE Final Technical Report, 22 Feb. 1979 - 22 Feb. 1981
Roy Kaplow Griffiss AFB, N.Y. RADC Oct. 1981 145 p refs
(Contract F19628-79-C-0055; AF Proj. 4600)
(AD-A108796; RADC-TR-81-292) Avail: NTIS HC A07/MF A01 CSCL 11/2

It is known that corrosion resistance can be imparted to various materials by carefully controlling the chemical environment to which newly formed and atomically clean surfaces are initially exposed. We take the view that the embrittlement of silica (SiO2) is also a corrosion process, originating from the activated hydrolysis of siloxane (Si-O-Si) bonds by molecular water. Our approach considers that surface states of SiO2 can be altered by the presence of absorbed or chemisorbed gases so as to increase the activation energy required for the absorption of water vapor or alternatively to impede the dissociation of molecular water on silica surfaces. Either of these mechanisms should raise the activation energy involved in hydrolyzing siloxane bonds and thus lower the susceptibility for crack propagation. Gases containing straight or branched chain hydrocarbons are expected to reduce the absorption potential for H2O for the silica surface. Absorbed gases containing strong polar residues such as halogens are expected to establish a surface dipole layer which may repel the absorbing end of H2O and prevent its dissociation on the silica surface. GRA

N82-19590# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
BASIS-CRACK: AN EVALUATION OF PERFORMANCE

Final Report
B. Palmberg 1981 36 p refs
(Contract FMV-F-FL-82223-78-003-21-001)
(FFA-TN-HU-2171) Avail: NTIS HC A03/MF A01

The BASIS-CRACK option, which can handle singularities in finite element shape functions thereby enabling the elements to be used for modeling cracks in a structure, is evaluated. The demands on the node grid and element size were investigated and the effects of varying the virtual crack extension or altering the crack growth direction were studied. Operation with different types of elements and mixture of different elements verifies the reliability and accuracy of the program. A combination of BASIS-CRACK and the SUPER-BASIS was tested successfuly. A crack tip element size of half the crack length is sufficient for an acceptable accuracy in the computed energy release rate.
Author (ESA)

N82-19591# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
DIFFERENCES BETWEEN THE GROWTH OF SMALL AND LARGE FATIGUE CRACKS. THE RELATION TO THRESHOLD K-VALUES
J. Schijve Jul. 1981 34 p refs Presented at Intern. Symp. on Fatigue Thresholds, Stockholm, 1-3 Jun. 1981
(VTH-LR-327) Avail: NTIS HC A03/MF A01

Differences in the behavior of small and large cracks, including microscopic and fractographic aspects, are analyzed. They are shown to be related to restraint on cyclic slip, the number of active slip systems, crack growth mechanics, and the irregularity of the crack front geometry at both micro and macro levels. A difference associated with residual plastic deformation in the wake of the crack is that large cracks are subject to more effective crack closure than small cracks. Illustrative crack growth data are presented. Nominal stress intensity factors are shown to be lower than actual in the case of small cracks, due to an underestimate of the stress severity at the crack tip. Threshold values of the stress intensity factor are not necessarily valid for small cracks. However, stress intensity factors can be used for small cracks for some (particularly high yield strength) materials.
Author (ESA)

N82-19592# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE STRESS INTENSITY FACTOR OF SMALL CRACKS AT NOTCHES
J. Schijve Jul. 1981 31 p refs
(VTH-LR-330) Avail: NTIS HC A03/MF A01

The effect of geometrical notches in a structure on fatigue crack propagation is investigated theoretically. Given that the stress distribution in the proximity of the notch is approximately the same for a variety of notches and stress concentration factors (Kt), if the peak stress at the notch (sigma peak) and root radius (rho) are the same, then small cracks occurring in similar stress fields have the same stress intensity factor (K): i.e., for small cracks K depends on sigma peak and rho only. Analysis of literature data confirms the similar concept that the geometry factor (C) in K = C sigma peak root pi 1, where 1 = crack length, depends on 1/rho.
Author (ESA)

N82-19593# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
SOME REAL VARIABLE EXPRESSIONS FOR STRESS DISTRIBUTIONS IN ORTHOTROPIC PLATES
G. J. Spies Sep. 1981 40 p refs
(VTH-LR-334) Avail: NTIS HC A03/MF A01

A number of solutions of Lekhnitskii's method for determining stress distributions in orthotropic plates are presented in a form containing only real variables. The expressions are exact solutions, giving stresses at the circular boundary as well as on the principal axes. The solutions are presented as an aid to the general designer of anisotropic structures requiring expressions which can be worked out on a pocket calculator. The general method yields simple expressions for stresses in several cases where a circular hole or a circular insert causes stress concentrations, but the formulas contain complex variables complicating their evaluation unless use can be made of a FORTRAN 4 programmed computer.
Author (ESA)

N82-19594# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
A NONLINEAR FINITE ELEMENT ANALYSIS OF RAPID CRACK GROWTH AT LARGE SCALE YIELDING
Lars Dahlberg Apr. 1980 33 p refs
(TRITA-HFL-0027; KTH-Publ-207; ISSN-0349-1234) Avail: NTIS HC A03/MF A01

Crack propagation experiments were performed on a highly loaded, single edge-notched rectangular sheet of cold rolled and hardened carbon steel. Crack lengths and signals from three strain gages were tape recorded. Results were analyzed with a finite element program, allowing for dynamic elastic-plastic calculations, using an elastic, linear, strain hardened plastic material model. Analysis, assuming purely linear elastic material behavior, was carried out for comparison. Values obtained in the elastic-plastic analysis were approximately half the corresponding values for purely elastic analysis, showing estimates of energy flow to the crack tip region to be influenced considerably by the introduction of plasticity into the analysis. Suitable models for the crack tip region are considered.
Author (ESA)

N82-19595# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
SENSITIVITY OF THE FRACTURE PROBABILITY IN A REACTOR VESSEL TO VARIATIONS IN DATA
Fred Nilsson and Stefan Palm May 1980 44 p refs
(TRITA-HFL-0028; KTH-Publ-208; SKI-B37/79) Avail: NTIS HC A03/MF A01

A theoretical probability model for fracture risk in nuclear reactor pressure vessels was developed. Input data based on theoretical estimates was selected, and variations about this basic set were performed. The resulting changes in total fracture probability were calculated in order to indicate the sensitivity of the total failure probability to changes in different parameters of the assumed input data. The method of linear elastic fracture mechanics was used to analyze failure risk. Fracture was assumed to occur when the stress intensity factor is greater than the fracture toughness of the material. Periodic inspection data from the fourth year onwards has little effect on predictions. Fracture probability is insensitive to length of working life, so calculating failure risk per vessel year can be highly misleading.
Author (ESA)

N82-19596# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Strength of Materials and Solid Mechanics.
ON THE INFLUENCE OF MEAN LOAD ON CRACK OPENING AND FATIGUE CRACK GROWTH IN A SHIP HULL PLATE STEEL
Stig Waestberg Oct. 1980 19 p refs
(TRITA-HFL-0029; KTH-Publ-209) Avail: NTIS HC A02/MF A01

The influence of mean load on crack closure in a steel for which the crack growth rate is largely insensitive to mean load was studied. Fatigue crack growth rates were measured in LR-DH quality steel for different stress ratios R-values under sinusoidal loading. No significant influence of the R-values was found in the loading range investigated. Crack surface displacements were recorded in order to detect possible crack closure during the lower part of the loading cycle. Crack lengths were measured by traveling microscope. No crack closure was observed. The results are discussed in terms of toughness (ability to withstand local static fracture during the upper part of the loading cycle) and the amount of stable crack growth during the loading cycle. No significant influence of the R-values (R = 0.04 to 0.8) is found in the load range from 10 to 40 Mpa root m.
Author (ESA)

N82-19597# Bristol Univ. (England). Dept. of Aeronautical Engineering.
THE STRUCTURAL BEHAVIOUR OF INFLATED CYLINDRICAL CANTILEVER BEAMS B.S. Thesis
R. J. Oldfield and D. M. Pearson Jun. 1981 83 p refs
(BU-260) Avail: NTIS HC A05/MF A01

A wing structure, consisting of spanwise inflatable cylinders, was considered for remotely piloted vehicle applications. The behavior of isolated pressurized cylinders mounted as cantilevers and subjected to bending, torsion, and combined loadings was investigated experimentally and theoretically. It was found that,

except in the case of pure torsion, the cylinders are able to withstand substantial loading even when in a partly wrinkled state. Theories derived for the behavior of the wrinkled cantilevers generally give reasonable predictions of the experimental results. An appraisal of a three cylinder combined structure leads to recommendations concerning the construction of such a wing structure. Author (ESA)

N82-19598# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
A COMPUTER PROGRAM FOR CYCLE-BY-CYCLE CRACK GROWTH COMPUTATION Final Report
Bjoern Palmberg 1981 112 p refs
(Contract FMV-F-K-82223-78-003-21-001)
(FFA-TN-HU-2048) Avail: NTIS HC A06/MF A01

A computer program which handles Paris crack propagation formulas, the Forman crack propagation formula, and the inverse tangent hyperbolic crack growth rate relation is presented. The crack growth increment for a load cycle is taken as the crack growth rate obtained by the selected formula, evaluated for the actual stress intensity range. Interaction effects in the loading history is considered by applying either Wheeler's or Willenborg's model for crack growth rate retardation. The program is written in BASIC and is run on a PDP 11/34 minicomputer. Author (ESA)

N82-19599# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
FATIGUE PERFORMANCE AND FASTENER FLEXIBILITY FOR SINGLE SHEAR ALUMINUM JOINT WITH DIFFERENT SPLICE PLATES Final Report
Bjoern Palmberg 1981 80 p refs Revised
(Contract FMV-F-FL-82223-78-00)
(FFA-TN-HU-2165) Avail: NTIS HC A05/MF A01

The influence of bending stiffness on secondary bending single shear double row joints was investigated. Countersunk steel bolts were installed in 6D10 holes. A load spectrum representing a fighter aircraft wing panel was used. It is shown that in fatigue life increases with increasing bending stiffness, and that secondary bending is decreased by a splice plate arrangement which has very low bending stiffness. The bolt flexibility is determined from measured values of splice plate elongation and the gap variation between the two base plates. It is found that different splice plates yield almost the same bolt flexibility and additional lubrication when torquing the simloc nuts increases fatigue life significantly. Author (ESA)

N82-19600# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
DURABILITY OF ADHESIVE BONDED STRUCTURES SUBJECTED TO ACOUSTIC LOADS
H. F. Wolfe (AFWAL, Wright-Patterson AFB, Ohio) and I. Holehouse (Rohr Industries, Chula Vista, Calif.) London Dec. 1981 16 p refs Presented at the 53rd Meeting of the AGARD Struct. and Mater. Panel, Noordwijkerhout, Netherlands, 27 Sep. - 2 Oct. 1981
(AGARD-R-701; ISBN-92-835-1409-2) Avail: NTIS HC A02/MF A01

Acoustic fatigue prediction techniques for weldbonded aluminum, adhesive bonded aluminum, an adhesive bonded graphite epoxy structures are summarized. Adequate performance under static loading did not guarantee adequate performance under dynamic loading. Some prediction methods were developed for certain failure modes in adhesive bonded aluminum and graphite epoxy bonded skin stiffened structures. Further investigations are needed to adequately predict the acoustic fatigue life of adhesive bonded aircraft structures. N.W.

N82-19157# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
A SUBSPACE ITERATION ALGORITHM FOR SPINNING STRUCTURE VIBRATION MODE COMPUTATION
D. Osmont and L. Simon *In its* La Rech. Aerospatiale, Bimonthly Bull. No. 1981-3, May-Jun. 1981 (ESA-TT-714) Oct. 1981 p 57-62 refs Transl. into ENGLISH of "La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-3, May-Jun. 1981" p 197-202
(For primary document see N82-19152 10-01)
Avail: NTIS HC A05/MF A01; original report in FRENCH available at ONERA, Paris FF 45

N82-20136# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
REYNOLDS STRESS EQUATIONS MODELING IN A ROTATING REFERENCE SYSTEM
J. Cousteix and B. Aupoix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 51-60 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 275-285
(For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography*.

N82-19601* Michigan Energy and Resource Research Association, Detroit.
RESOURCEFUL DECISIONS: LANDSAT IN MICHIGAN
Todd Anuskiewicz, Principal Investigator and Roy Meador [1982] 29 p Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS
(E82-10037; NASA-CR-164771) Avail: SOD HC CSCL 05B

The capabilities of LANDSAT and the continuous advantages the satellite offers in remote sensing are reviewed. The processing and application of data from the satellite to the study of resource and environmental needs in Michigan highlighted include: land use; classification of trophic states in lakes and the monitoring of water quality; prospecting for oil, gas, minerals, and water; identifying wetlands, wildlife habitats, and recreation areas; forest management; routing power lines; transportation planning; and surveying the Great Lakes Basin. The work of the Environmental Research Institute of Michigan in solving modern sensor technological problems and in gathering ground truth is reported as well as activities available through the University of Michigan remote sensing program. A.R.H.

N82-19602 Utah State Univ., Logan.
MODEL CHOICE: AN OPERATIONAL COMPARISON OF STOCHASTIC STREAMFLOW MODELS FOR DROUGHTS Ph.D. Thesis
William Robert James 1981 312 p
Avail: Univ. Microfilms Order No. 81213830

Five annual stochastic streamflow generation models are compared on their ability to preserve drought-related time series properties and annual statistics. Using Monte Carlo generation procedures and comparing the average generated statistics and drought or water supply properties, a basis is established to evaluate model performance on four different Utah study streams. A seasonal disaggregation model is applied to each of the generated annual model. The ARMA-Markov and ARMA models are judged to be the best overall models in terms of preserving the short and long term persistence statistics for the four historic time series studied. The broken line model is judged to be the best model in terms of minimizing the economic regret as determined by an agricultural crop production function. Dissert. Abstr.

N82-19603 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
HELMUT WOLF: ON THE OCCASION OF HIS 70TH BIRTHDAY [HELMUT WOLF ZUM 70. GEBURTSTAG]
Verlag der Bayerischen Akademie der Wissenschaften 1980 45 p refs In GERMAN Presented at Bonn, 2 May 1980
(Ser-E-18; ISSN-0065-5341; ISBN-3-7696-9663-8) Copyright. Avail: Issuing Activity

The life and accomplishments of Helmut Wolf, and his contribution to theoretical geodesy are described. A collection of publications and lectures in the geodetic sciences is presented. Wolf's contribution to the development of geodestic surveys and to the mathematical and stochastic model of photogrammetry are outlined. Transl. by E.A.K.

N82-19604 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
DEVELOPMENTS IN GEODESY WITHIN THE SCOPE OF HELMUT WOLF'S WORK [DIE ENTWICKLUNG DER ERDMESSUNG IN SPIEGEL DES WERKES HELMUT WOLFS]
Helmut Moritz *In its* Helmut Wolf: On the Occasion of his 70th Birthday 1980 p 5-12 In GERMAN (For primary document see N82-19603 10-43)
Avail: Issuing Activity

Twenty years of progress in geodetic surveys, the use of artificial satellites and their practical applications are described. Gravimetric methods, astrogeodetic methods, statistical procedures in the physical geodesy, and geodetic problems in geodynamics are discussed. It is found that in the geometric reference system of deep geodynamic observations the axis of rotation of the Earth is a fundamental direction of reference which changes, whether it is in the universe or on terrestrial bodies. E.A.K.

N82-19605 Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
MATHEMATICAL AND STOCHASTIC MODELS IN PHOTOGRAMMETRY RELATING TO HELMUT WOLF'S WORK [DAS MATHEMATISCHE UND STOCHASTISCHE MODELL DER PHOTOGRAMMETRIE MIT BEZUG AUF DAS WERK HELMUT WOLFS]
Hellmut Schmid *In its* Helmut Wolf: On the Occasion of his 70th Birthday 1980 p 13-27 In GERMAN (For primary document see N82-19603 10-43)
Avail: Issuing Activity

The development of a mathematical model which is applied to interpret the measured variables and random variables with their characteristic random noise is discussed. It is posited that for typical geometric problems, as well as for geodetic and photogrammetric tasks it is possible to analyze specific geometrically established solvent algorithms quantitatively and qualitatively. Such a computing method is often advantageous, especially because it can be applied to practical engineering. E.A.K.

N82-19606 IEA Coal Research, London (England).
HYDROLOGICAL PROBLEMS OF SURFACE MINING
Peter A. Wood Sep. 1981 102 p refs
(ICTIS-TR-17; ISBN-92-9209-079-X) Copyright. Avail: Issuing Activity

The physical aspects of the relation between hydrology and the surface mining of coal are reviewed. Surface and ground water are considered at the planning, extraction and restoration phases of mining. Aspects covered include the collection and handling of hydrologica data; the construction of river diversions; the control of runoff, erosion and sediment; problems of ground water and dewatering; and spoil bank hydrology. Mining hydrology interrelationships must be considered in order to ensure the efficient running of a surface mining operation while adequately protecting the environment. Author (ESA)

N82-19607*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
WHEAT STRESS INDICATOR MODEL, CROP CONDITION ASSESSMENT DIVISION (CCAD) DATA BASE INTERFACE DRIVER, USER'S MANUAL
R. F. Hansen, Principal Investigator Feb. 1981 15 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10031; NASA-CR-161032; EW-L1-00711; LEMSCO-16034; JSC-17114) Avail: NTIS HC A02/MF A01 CSCL 02C

The use of the wheat stress indicator model CCAD data base interface driver is described. The purpose of this system is to interface the wheat stress indicator model with the CCAD operational data base. The interface driver routine decides what meteorological stations should be processed and calls the proper subroutines to process the stations. Author

N82-19608*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: INTERIM CATALOG GROUND DATA SUMMARY, DATA ACQUISITION YEAR 1979
H. M. Doyle and V. L. Cook, Principal Investigators Feb. 1981 32 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. Agristars)
(E82-10032; NASA-CR-161033; MU-L1-04055; LEMSCO-16207; JSC-17119) Avail: NTIS HC A03/MF A01 CSCL 02C

To honor numerous requests for information about data holdings, and to facilitate the requirements specifications process, a series of interim catalogs are being developed. The 1979 data acquisition year is covered in this volume with subsequent years to follow under different covers. This catalog lists by state those sample segment numbers for which aircraft data has been acquired and/or field inventory products produced. A.R.H.

N82-19609*# Mississippi State Univ., Mississippi State.
APPLICATION OF REMOTE SENSING TO STATE AND REGIONAL PROBLEMS Semiannual Progress Report, 1 Nov. 1980 - 30 Apr. 1981
W. Frank Miller, John S. Powers, Jon R. Clark, Jimmy L. Solomon, and Sidney G. Williams, Principal Investigators 30 Apr. 1981 106 p refs ERTS
(Grant NGL-25-001-054)
(E82-10033; NASA-CR-164746; SAPR-15) Avail: NTIS HC A06/MF A01 CSCL 05B

The methods and procedures used, accomplishments, current status, and future plans are discussed for each of the following applications of LANDSAT in Mississippi: (1) land use planning in Lowndes County; (2) strip mine inventory and reclamation; (3) white-tailed deer habitat evaluation; (4) remote sensing data analysis support systems; (5) discrimination of unique forest habitats in potential lignite areas; (6) changes in gravel operations; and (7) determining freshwater wetlands for inventory and monitoring. The documentation of all existing software and the integration of the image analysis and data base software into a single package are now considered very high priority items. A.R.H.

N82-19610*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
RECOMMENDED DATA SETS, CORN SEGMENTS AND SPRING WHEAT SEGMENTS, FOR USE IN PROGRAM DEVELOPMENT
Willa W. Austin, Principal Investigator Apr. 1981 27 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10034; NASA-CR-161034; SR-L1-0409; LEMSCO-15708; JSC-17137) Avail: NTIS HC A03/MF A01 CSCL 02C

The sets of Large Area Crop Inventory Experiment sites, crop year 1978, which are recommended for use in the development and evaluation of classification techniques based on LANDSAT spectral data are presented. For each site, the following exists: (1) accuracy assessment digitized ground truth; (2) a minimum of 5 percent of the scene ground truth identified as corn or spring wheat; and (3) at least four acquisitions of acceptable data quality during the growing season of the crop of interest. The recommended data sets consist of 41 corn/soybean sites and 17 spring wheat sites. Author

N82-19611*# National Aeronautics and Space Administration, Washington, D. C.

SATELLITE EARTH RESOURCES DATA, MODULE U-3

Jan. 1980 13 p Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Fals, S.D. 57198. ERTS

(E82-10035; NASA-TM-84130) Avail: NTIS HC A02/MF A01 CSCL 05B

Satellite data image products potentially useful in solving Earth resource and environmental problems are described. Sources for satellite data and user information are given. Recommendations for suitability of use of data from each satellite are presented. Satellite sources of Earth resources data are summarized for satellites launched since 1965 and those projected for launch through the late 1980s. The sensors of interest on each satellite, the wavelength or frequency of operation, and the resolution are given. Color ranges are illustrated and compared. The form and utility of aircraft and LANDSAT images are compared. Data from the Gemini-Apollo photography, Skylab, meteorological satellites, the Heat Capacity Mapping Mission, the Coastal Zone Color Scanner, Seasat, LANDSAT, and projected future satellites are briefly described. J.D.H.

N82-19612*# Consiglio Nazionale delle Ricerche, Venice (Italy). Lab. per lo Studio della Dinamica delle Grandi Masse.

LANDSAT IMAGERY OF THE VENETIAN LAGOON: A MULTITEMPORAL ANALYSIS

L. Alberotanza and A. Zandonella, Principal Investigators (Telespazio S.p.A., Rome) 1980 9 p refs Sponsored by NASA ERTS

(E82-10036; NASA-CR-164772) Avail: NTIS HC A02/MF A01 CSCL 08H

The use of LANDSAT multispectral scanner images from 1975 to 1979 to determine pollution dispersion in the central basin of the lagoon under varying tidal conditions is described. Images taken during the late spring and representing both short and long range tidal dynamics were processed for partial haze removal and removal of residual striping. Selected spectral bands were correlated to different types of turbid water. The multitemporal data was calibrated, classified considering sea truth data, and evaluated. The classification differentiated tide diffusion, algae belts, and industrial, agricultural, and urban turbidity distributions. Pollution concentration is derived during the short time interval between inflow and outflow and from the distance between the two lagoon inlets and the industrial zones. Increasing pollution of the lagoon is indicated. J.D.H.

N82-19613*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A COMPARISON OF UNSUPERVISED CLASSIFICATION PROCEDURES ON LANDSAT MSS DATA FOR AN AREA OF COMPLEX SURFACE CONDITIONS IN BASILICATA, SOUTHERN ITALY

Chris Justice and John Townshend, Principal Investigators Mar. 1981 40 p refs Submitted for publication Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux, Falls, S.D. 57198. ERTS

(E82-10038; NASA-TM-82098) Avail: NTIS HC A03/MF A01 CSCL 05B

Two unsupervised classification procedures were applied to ratioed and unratioed LANDSAT multispectral scanner data of an area of spatially complex vegetation and terrain. An objective accuracy assessment was undertaken on each classification and comparison was made of the classification accuracies. The two unsupervised procedures use the same clustering algorithm. By on procedure the entire area is clustered and by the other a representative sample of the area is clustered and the resulting statistics are extrapolated to the remaining area using a maximum likelihood classifier. Explanation is given of the major steps in the classification procedures including image preprocessing; classification; interpretation of cluster classes; and accuracy assessment. Of the four classifications undertaken, the monocluster block approach on the unratioed data gave the highest accuracy of 80% for five coarse cover classes. This accuracy was increased to 84% by applying a 3 x 3 contextual filter to the classified image. A detailed description and partial explanation is provided for the major misclassification. The classification of the unratioed data produced higher pecentage accuracies than for the ratioed data and the monocluster block approach gave higher accuracies than clustering the entire area. The moncluster block approach was additionally the most economical in terms of computing time. Author

N82-19614*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

AGRISTARS: FOREIGN COMMODITY PRODUCTION FORECASTING. MINUTES OF THE ANNUAL FORMAL PROJECT MANAGER'S REVIEW, INCLUDING PRELIMINARY TECHNICAL REVIEW REPORTS OF FY80 EXPERIMENTS

24 Sep. 1980 191 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development

(Proj. AgRISTARS)

(E82-10039; NASA-TM-84050; FC-J0-00502; JSC-16823) Avail: NTIS HC A09/MF A01 CSCL 02C

The U.S./Canada wheat/barley exploratory experiment is discussed with emphasis on labeling, machine processing using P1A, and the crop calendar. Classification and the simulated aggregation test used in the U.S. corn/soybean exploratory experiment are also considered. Topics covered regarding the foreign commodity production forecasting project include: (1) the acquisition, handling, and processing of both U.S. and foreign agricultural data, as well as meteorological data. The accuracy assessment methodology, multicrop sampling and aggregation technology development, frame development, the yield project interface, and classification for area estimation are also examined. A.R.H.

N82-19615*# Florida Univ., Gainesville. Inst. of Food and Agricultural Sciences.

USE OF THERMAL INERTIA DETERMINED BY HCMM TO PREDICT NOCTURNAL COLD PRONE AREAS IN FLORIDA Quarterly Report, 16 Mar. - 15 Jun. 1981

L. H. Allen, Jr., Principal Investigator, Ellen Chen, J. D. Martsolf, and P. H. Jones 15 Jun. 1981 36 p refs Original contains color imagery. Original imagery may be purchased from NASA Goddard Space Flight Center, (Code 601), Greenbelt, Md. 20771. Domestic users send orders to 'Attn: National Space Science Data Center', non-domestic users send orders to 'Attn: World Data Center A for Rockets and Satellites'. HCMM

(Contract NAS5-26453)

(E82-10040; NASA-CR-164917; QR-1) Avail: NTIS HC A03/MF A01 CSCL 04B

The HCMM transparency scenes for the available winter of 1978-1979 were evaluated; scenes were identified on processed magnetic tapes; other remote sensing information was identified; and a soil heat flux model with variable-depth thermal profile was developed. The Image 100 system was used to compare HCMM and GOES transparent images of surface thermal patterns. Excellent correspondence of patterns was found, with HCMM giving the greater resolution. One image shows details of thermal patterns in Florida that are attributable to difference in near surface water contents. The wide range of surface temperatures attributable to surface thermal inertia that exist in the relatively flat Florida topography is demonstrated. A.R.H.

N82-19616*# Business and Technological Systems, Inc., Seabrook, Md.

EQUIVALENT SOURCE MODELING OF THE MAIN FIELD USING MAGSAT DATA Quarterly Report, 1 Apr. - 30 Jun. 1981

11 Aug. 1981 4 p ERTS

(Contract NAS5-26047)

(E82-10041; NASA-CR-164918; QR-6) Avail: NTIS HC A02/MF A01 CSCL 08G

Magsat dipole solution models were obtained with both 32 deg and 21 deg resolution based on a data set extending over 4 months. Time dependence was modeled using first time derivatives for the dipole magnetization vector components. This doubles the n total number of parameters in the solution. The solutions displayed a very slow convergence in time derivatives although at each iteration the conversion of the dipole parameters to spherical harmonic coefficients showed close agreement with the MGST (12/80) spherical harmonic model to degree 13 in the constant terms and 8 in the secular variation terms. The

program error in the option to simultaneously estimate observatory anomaly biases was found and corrected. A 32 deg resolution dipole model was generated using the selected magnetic observatory data from 1960-1977 used in the GSFC (9/80) spherical harmonic model. A.R.H.

N82-19617*# Pennsylvania State Univ., University Park. Office for Remote Sensing of Earth Resources.
DELINEATION OF SOIL TEMPERATURE REGIMES FROM HCMM DATA Quarterly Report
Rick L. Day and Gary W. Petersen, Principal Investigators 30 Sep. 1981 3 p Sponsored by NASA HCMM
(E82-10042; NASA-CR-164919) Avail: NTIS HC A02/MF A01 CSCL 08M

Supplementary data including photographs as well as topographic, geologic, and soil maps were obtained and evaluated for ground truth purposes and control point selection. A study area (approximately 450 by 450 pixels) was subset from LANDSAT scene No. 2477-17142. Geometric corrections and scaling were performed. Initial enhancement techniques were initiated to aid control point selection and soils interpretation. The SUBSET program was modified to read HCMM tapes and HCMM data were reformated so that they are compatible with the ORSER system. Initial NMAP products of geometrically corrected and scaled raw data tapes (unregistered) of the study were produced. A.R.H.

N82-19618*# Brown Univ., Providence, R. I. Dept. of Geological Sciences.
ELECTROMAGNETIC DEEP-PROBING (100-1000 KMS) OF THE EARTH'S INTERIOR FROM ARTIFICIAL SATELLITES: CONSTRAINTS ON THE REGIONAL EMPLACEMENT OF CRUSTAL RESOURCES Quarterly Progress Report, 30 Jun. - 30 Sep. 1981
John F. Hermance, Principal Investigator 30 Sep. 1981 9 p refs ERTS
(Contract NAS5-26138)
(E82-10043; NASA-CR-164920; QPR-5) Avail: NTIS HC A02/MF A01 CSCL 08G

An algorithm was developed to address the problem of electromagnetic coupling of ionospheric current systems to both a homogeneous Earth having finite conductivity, and to an Earth having gross lateral variations in its conductivity structure, e.g., the ocean-land interface. Typical results from the model simulation for ionospheric currents flowing parallel to a representative geologic discontinuity are shown. Although the total magnetic field component at the satellite altitude is an order of magnitude smaller than at the Earth's surface (because of cancellation effects from the source current), the anomalous behavior of the satellite observations as the vehicle passes over the geologic contact is relatively more important pronounced. The results discriminate among gross lithospheric structures because of difference in electrical conductivity. A.R.H.

N82-19619*# Brown Univ., Providence, R. I.
ELECTROMAGNETIC DEEP-PROBING (100-1000 KMS) OF THE EARTH'S INTERIOR FROM ARTIFICIAL SATELLITES: CONSTRAINTS ON THE REGIONAL EMPLACEMENT OF CRUSTAL RESOURCES Quarterly Progress Report, 31 Mar. 1980 - 30 Jun. 1981
John F. Hermance, Principal Investigator 30 Sep. 1981 5 p ERTS
(Contract NAS5-26138)
(E82-10044; NASA-CR-164921; QPR-4) Avail: NTIS HC A02/MF A01 CSCL 08G

Efforts continue in the development of a computer program for looking at the coupling of finite-dimensional source fields with a laterally heterogeneous Earth. An algorithm is also being developed for calculating a time-varying reference field using ground-based magnetic observatory data. It was discovered that ground-based standard magnetic observation is not as so available for the time of the MAGSAT mission as might be expected. Attempts are being made to determine the exact times and observatories from which data are avaliable. A.R.H.

N82-19620*# Business and Technological Systems, Inc., Seabrook, Md.
MAGSAT SCIENCE INVESTIGATIONS Quarterly Report, 1 Jun. - 30 Aug. 1981
30 Aug. 1981 4 p ERTS
(Contract NAS5-26328)
(E82-10045; NASA-CR-164922; QR-4) Avail: NTIS HC A02/MF A01 CSCL 08G

The optimal source spacing for the computer delta-B data set was determined from the intermediate attitude tapes. A U.S. magnetization map based on this result is in preparation. Computed delta-B from the fine-attitude tapes is unexpectedly noisy; the reason for this is being sought. A.R.H.

N82-19621*# Agricultural Research Service, Weslaco, Tex.
METHODS OF EDITING CLOUD AND ATMOSPHERIC LAYER AFFECTED PIXELS FROM SATELLITE DATA Quarterly Progress Report, 5 Jun. - 5 Sep. 1981
Paul R. Nixon, Principal Investigator, Craig L. Wiegand, Arthur J. Richardson, Michael P. Johnson, and Benjamin G. Goodier Sep. 1981 10 p ERTS
(NASA Order S-75406-B)
(E82-10046; NASA-CR-164923; QPR-3) Avail: NTIS HC A02/MF A01 CSCL 05B

The location and migration of cloud, land and water features were examined in spectral space (reflective VIS vs. emissive IR). Daytime HCMM data showed two distinct types of cloud affected pixels in the south Texas test area. High altitude cirrus and/or cirrostratus and 'subvisible cirrus' (SCi) reflected the same or only slightly more than land features. In the emissive band, the digital counts ranged from 1 to over 75 and overlapped land features. Pixels consisting of cumulus clouds, or of mixed cumulus and landscape, clustered in a different area of spectral space than the high altitude cloud pixels. Cumulus affected pixels were more reflective than land and water pixels. In August the high altitude clouds and SCi were more emissive than similar clouds were in July. Four-channel TIROS-N data were examined with the objective of developing a multispectral screening technique for removing SCi contaminated data. Author

N82-19622*# Miami Univ., Fla. School of Marine and Atmospheric Science.
INVESTIGATIONS OF MEDIUM WAVELENGTH MAGNETIC ANOMALIES IN THE EASTERN PACIFIC USING MAGSAT DATA Interim Report, Apr. - Jun. 1981
Christopher G. A. Harrison, Principal Investigator Jun. 1981 3 p Sponsored by NASA ERTS
(E82-10047; NASA-CR-164924) Avail: NTIS HC A02/MF A01 CSCL 08G

Processing continued on the data set covering the first three months of the mission. Orbits were selected over a specified range of longitude and latitude and those orbits falling within the geographical boundaries were stored on a disk and a listing made. To verify the quality of the data, plots were made showing altitude vs latitude, anomalous field vs latitude, and corrected anomalous field vs latitude. Results of the plotting showed that: (1) data from the first day of the mission are not usable because they are too noisy; (2) some orbits contain spikes, no doubt a processing error on the tape; (3) some orbits contain a 20 deg region in latitude, offset roughly 30 nT from the rest of the anomalous field profiles; and (4) the correlation between the adjacent orbits is poor. Even the new ring current coefficients provided with a later, corrected set of data tapes did not not yield the desired correlations. A.R.H.

N82-19623*# Pennsylvania State Univ., University Park. Dept. of Meteorology.
INTERACTIVE INITIALIZATION OF HEAT FLUX PARAMETERS FOR NUMERICAL MODELS USING SATELLITE TEMPERATURE MEASUREMENTS Quarterly Report, 1 Jun. - 31 Aug. 1981
Toby N. Carlson, Principal Investigator 31 Aug. 1981 5 p Sponsored by NASA HCMM
(E82-10048; NASA-CR-164925; QR-2) Avail: NTIS HC A02/MF A01 CSCL 08M

Day/night Heat Capacity Mapping Mission image pairs over Kansas and Indiana were used to examine the spatial variation of moisture availability on the mesoscale. Of particular concern was whether patterns of moisture availability and thermal inertia, as well as surface heat fluxes, respond to significant spatial

variations in the rainfall pattern. A temperature analysis for the Indiana case is presented. M.G.

N82-19624*# Iowa Univ., Iowa City. Dept. of Geology.
USE OF MAGSAT ANOMALY DATA FOR CRUSTAL STRUCTURE AND MINERAL RESOURCES IN THE US MIDCONTINENT Quarterly Report, period ending 30 Sep. 1981
Robert S. Carmichael, Principal Investigator 28 Sep. 1981 10 p Original contains color illustrations ERTS
(Contract NAS5-26425)
(E82-10049; NASA-CR-164926; QR-3) Avail: NTIS HC A02/MF A01 CSCL 08G

Magnetic profiles on individual satellites tracks were examined to identify bad (nonterrestrially-based) data points r profiles. Anomaly profiles for the same satellite track, but at different passes were compared for parallel tracks and for tracks that cross. The selected and processed data were plotted and contoured to develop a preliminary magnetic anomaly map. The map is similar in general morphology to NASA's Magsat global scalar anomaly map, but has more detail which is related to crustal properties. Efforts have begun to interpret the satellite magnetic anomalies in terms of crustal character. The correlation of magnetics with crustal petrology may have a much larger tectonic implication. Th possibility of there being an ultramafic lower crust along one zone as a consequence of a continental collision/subduction which helped form the midcontinent craton in Precambrian times is being investigated. A.R.H.

N82-19625*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STUDIES RELATED TO MAGSAT Progress Report, period ending Sep. 1981
David P. Stern, Principal Investigator 30 Sep. 1981 21 p ERTS
(E82-10050; NASA-TM-84129) Avail: NTIS HC A02/MF A01 CSCL 08G

The westward drift of the geomagnetic field was analyzed using models from Magsat which include secular variation. Two approaches were utilized. A straightforward covariance method gave large drift rates (0.25 degr./yr and up) and suggested that the drift was larger in the Southern Hemisphere than in the Northern, and was small near the poles. The drawback was a rather large noise level superimposed on a small signal. The other approach followed the method of A.D. Richmond and obtained drifts of the order of 0.1 deg/yr. The use of Magsat to study the Backus effect is explored. Particular attention is drawn to the comparison with resuls of general inverse analysis. A.R.H.

N82-19626*# Phoenix Corp., McLean, Va.
IMPROVED DEFINITION OF CRUSTAL ANOMALIES FOR MAGSAT DATA Quarterly Report
25 Mar. 1981 11 p ERTS
(Contract NAS5-25882)
(E82-10051; NASA-CR-164928; QR-6) Avail: NTIS HC A02/MF A01 CSCL 08G

A scheme was developed for separating the portions of the magnetic field measured by the Magsat 1 satellite that arise from internal and external sources. To test this method, a set of sample coefficients were used to compute the field values along a simulated satellite orbit. This data was then used to try to recover the original coefficients. Matrix inversion and recursive least squares methods were used to solve for the input coefficients. The accuracy of the two methods are compared. M.G.

N82-19627*# Public Technology, Inc., Washington, D. C.
REMOTE SENSING PROCUREMENT PACKAGE: A MANAGEMENT REPORT FOR STATE AND LOCAL GOVERNMENTS
Jun. 1981 21 p ERTS
(Contract NAS13-129)
(E82-10052; NASA-CR-168633) Avail: NTIS HC A02/MF A01 CSCL 05B

An overview of the remote sensing procurement process is presented for chief executives, senior administrators, and other local and state officials responsible for purchasing remote sensing products, services, or equipment. Guidelines are provided for planning, organizing, staffing, and implementing such a procurement project. Other sections of the four-volume package are described and their benefits examined. A.R.H.

N82-19628*# Department of Agriculture, Houston, Tex.
AGRISTARS: SOIL MOISTURE/EARLY WARNING AND CROP CONDITION ASSESSMENT. INTERFACE CONTROL DOCUMENT
Nov. 1980 13 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10053; NASA-CR-161028; MU-JO-0101; JSC-16842) Avail: NTIS HC A02/MF A01 CSCL 02C

The interactions and support functions required between the early warning/crop condition assessment (EW/CCA) project and soil moisture (SM) project are defined. The EW Project aims to develop, test and evaluate techniques and procedures for adapting remote sensing technology to provide early warning of events and the timely assessment of those factors which affect the quality and quantity of production of economically important crops. Those techniques to augment and reinforce the current assessment activities are to be developed to improve the definition of the relationship between the plant(s) and its environment. This assessment and evaluation will certainly include the need for soil moisture measurement and estimation. The SM Project aims to develop, test, and evaluate techniques and procedures to measure or predict soil moisture in the root zone using both contact and remote sensors. A.R.H.

N82-19629*# Department of Agriculture, Houston, Tex.
AGRISTARS: YIELD MODEL DEVELOPMENT/SOIL MOISTURE. INTERFACE CONTROL DOCUMENT
Nov. 1980 12 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10054; NASA-CR-161029; MU-JO-0100; JSC-16841) Avail: NTIS HC A02/MF A01 CSCL 02C

The interactions and support functions required between the crop Yield Model Development (YMD) Project and Soil Moisture (SM) Project are defined. The requirements for YMD support of SM and vice-versa are outlined. Specific tasks in support of these interfaces are defined for development of support functions. J.D.H.

N82-19630*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: EARLY WARNING AND CROP CONDITION ASSESSMENT. PATCH IMAGE PROCESSOR USER'S MANUAL
M. J. Nieves, Principal Investigator Sep. 1980 12 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10055; NASA-CR-161038; EW-LO-00707; LEMSCO-15692; JSC-16833) Avail: NTIS HC A02/MF A01 CSCL 02C

The Patch Image Processor extracts patches in various size (32x32, 64x64, 128x128, and 256x256 pixels) from full-frame Landsat imagery data. With the patches that are extracted, a patch image mosaic is created in the image processing system, IMDACS, format. Author

N82-19631*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AGRISTARS: FOREIGN COMMODITY PRODUCTION FORECASTING. CORN/SOYBEAN DECISION LOGIC DEVELOPMENT AND TESTING
C. L. Dailey and K. M. Abotteen, Principal Investigators Oct. 1980 81 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10056; NASA-CR-161024; FC-LO-00480; LEMSCO-14811; JSC-16380) Avail: NTIS HC A05/MF A01 CSCL 02C

The development and testing of an analysis procedure which

was developed to improve the consistency and objectively of crop identification using LANDSAT data is described. The procedure was developed to identify corn and soybean crops in the U.S. corn belt region. The procedure consists of a series of decision points arranged in a tree-like structure, the branches of which lead an analyst to crop labels. The specific decision logic is designed to maximize the objectively of the identification process and to promote the possibility of future automation. Significant results are summarized. J.D.H.

N82-19632*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

AGRICULTURAL SOIL MOISTURE EXPERIMENT, COLBY, KANSAS 1978: MEASURED AND PREDICTED HYDROLOGICAL PROPERTIES OF THE SOIL

L. M. Arya, Principal Investigator Oct. 1980 46 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10057; NASA-CR-161025; SM-LO-00463; LEMSCO-14307; JSC-16366) Avail: NTIS HC A03/MF A01 CSCL 02C

Predictive procedures for developing soil hydrologic properties (i.e., relationships of soil water pressure and hydraulic conductivity to soil water content) are presented. Three models of the soil water pressure-water content relationship and one model of the hydraulic conductivity-water content relationship are discussed. Input requirements for the models are indicated, and computational procedures are outlined. Computed hydrologic properties for Keith silt loam, a soil typer near Colby, Kansas, on which the 1978 Agricultural Soil Moisture Experiment was conducted, are presented. A comparison of computed results with experimental data in the dry range shows that analytical models utilizing a few basic hydrophysical parameters can produce satisfactory data for large-scale applications. Author

N82-19633*# Department of Agriculture, Houston, Tex. Soil Conservation Service.

TAXONOMIC CLASSIFICATION OF WORLD MAP UNITS IN CROP PRODUCING AREAS OF ARGENTINA AND BRAZIL WITH REPRESENTATIVE US SOIL SERIES AND MAJOR LAND RESOURCE AREAS IN WHICH THEY OCCUR

Horace F. Huckle, Principal Investigator Oct. 1980 42 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E82-10058; NASA-CR-161021; SR-UO-00497; JSC-16824) Avail: NTIS HC A03/MF A01 CSCL 02C

The most probable current U.S. taxonomic classification of the soils estimated to dominate world soil map units (WSM)) in selected crop producing states of Argentina and Brazil are presented. Representative U.S. soil series the units are given. The map units occurring in each state are listed with areal extent and major U.S. land resource areas in which similar soils most probably occur. Soil series sampled in LARS Technical Report 111579 and major land resource areas in which they occur with corresponding similar WSM units at the taxonomic subgroup levels are given. Author

N82-19634*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

PRELIMINARY EVALUATION OF SPECTRAL, NORMAL AND METEOROLOGICAL CROP STAGE ESTIMATION APPROACHES

R. B. Cate, J. A. Artley, P. C. Doraiswamy, T. Hodges, M. C. Kinsler, D. E. Phinney, and M. L. Sestak, Principal Investigators Oct. 1980 74 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10059; NASA-CR-161023; SR-LO-04002; LEMSCO-14640; JSC-16830) Avail: NTIS HC A04/MF A01 CSCL 02C

Several of the projects in the AgRISTARS program require crop phenology information, including classification, acreage and yield estimation, and detection of episodal events. This study evaluates several crop calendar estimation techniques for their potential use in the program. The techniques, although generic in approach, were developed and tested on spring wheat data collected in 1978. There are three basic approaches to crop stage estimation: historical averages for an area (normal crop calendars), agrometeorological modeling of known crop-weather relationships agrometeorological (agromet) crop calendars, and interpretation of spectral signatures (spectral crop calendars). In all, 10 combinations of planting and biostage estimation models were evaluated. Dates of stage occurrence are estimated with biases between -4 and +4 days while root mean square errors range from 10 to 15 days. Results are inconclusive as to the superiority of any of the models and further evaluation of the models with the 1979 data set is recommended. Author

N82-19635*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.

NOTES FOR BRAZIL SAMPLING FRAME EVALUATION TRIP Technical Report, 1 - 19 Feb. 1981

Robert Horvath, Principal Investigator and David R. Hicks, comp. Aug. 1981 32 p ref Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior and Agency for International Development ERTS
(Contract NAS9-15476; Proj. AgRISTARS)
(E82-10060; NASA-CR-167420; SR-E1-04138; ERIM-152400-7-T) Avail: NTIS HC A03/MF A01 CSCL 02C

Field notes describing a trip conducted in Brazil are presented. This trip was conducted for the purpose of evaluating a sample frame developed using LANDSAT full frame images by the USDA Economic and Statistics Service for the eventual purpose of cropland production estimation with LANDSAT by the Foreign Commodity Production Forecasting Project of the AgRISTARS program. Six areas were analyzed on the basis of land use, crop land in corn and soybean, field size and soil type. The analysis indicated generally successful use of LANDSAT images for purposes of remote large area land use stratification. Author

N82-19636*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.

SEGMENT-LEVEL EVALUATION OF THE SIMULATED AGGREGATION TEST: US CORN AND SOYBEAN EXPLORATORY EXPERIMENT

S. A. Davidson, Principal Investigator Oct. 1980 26 p refs Sponsored by NASA, USDA, Dept. of Commerce, of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E82-10061; NASA-CR-161022; FC-LO-00493; LEMSCO-15116; JSC-16820) Avail: NTIS HC A03/MF A01 CSCL 02C

An evaluation of the corn and soybean proportion-estimation accuracy and dot labeling accuracy of the Simulated Aggregation Test, U.S. Corn and Soybean Exploratory Experiment, is presented. These results are in turn compared with the corn and soybean proportion-estimation accuracy and dot labeling accuracy of the Classification Procedures Verification Test. Author

N82-19637*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

LONGWALL GUIDANCE AND CONTROL DEVELOPMENT Final Report, 1974 - 1982

31 Jan. 1982 118 p refs
(Contract ET-75-I-01-9012)
(NASA-TM-82455) Avail: NTIS HC A06/MF A01 CSCL 08I

The longwall guidance and control (G&C) system was evaluated to determine which systems and subsystems lent themselves to automatic control in the mining of coal. The upper coal/shale interface was identified as the reference for a vertical G&C system, with two sensors (the natural backgound and the sensitized pick) being used to locate and track this boundary. In order to insure a relatively smooth recession surface (roof and floor of the excavated seam), a last and present cut measuring instrument (acoustic sensor) was used. Potentiometers were used to measure elevations of the shearer arms. The intergration of these components comprised the vertical control system (pitch control). Yaw and roll control were incorporated into a face alignment system which was designed to keep the coal face normal to its external boundaries. Numerous tests, in the laboratory

and in the field, have confirmed the feasibility of automatic horizon control, as well as determining the face alignment. S.L.

N82-19638*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
DIELECTRIC PROPERTIES OF SNOW Interim Technical Report
W. H. Stiles and F. T. Ulaby Greenbelt, Md. NASA. Goddard Space Flight Center Dec. 1981 43 p refs
(Grant NAG5-163)
(NASA-CR-166764; RSL-TR-527-1) Avail: NTIS HC A03/MF A01 CSCL 08L

The dielectric properties of snow in the radio frequency range from 100 KHz to 35 GHz are reviewed. Applicable dielectric mixing formulas are discussed and compared to available experimental data. S.L.

N82-19639# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
UTILIZATION OF AEROCHROME 2443 FILM FOR IDENTIFICATION AND ESTIMATING WHEAT GROWING AREAS
Francisco Jose Mendonca, Angela Maria DeLima, Antonio Teraldi Tardin, Armando P. Dossantos, Dall Arthur Cottrell, David C. L. Lee, Fernando C. S. Maia, Liane A. M. Lucht, Mauricio A. Moreira, and Rene Antonio Novaes Aug. 1981 10 p refs In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-2197-PRE/006) Avail: NTIS HC A02/MF A01

To identify and estimate wheat area using remote sensing techniques, aerial photographs were taken using KODAK Aerochrome 2443, at Soledade, Cruz Alta, and Santa Angelo in the state of Rio Grande do Sul, the photographs were interpreted manually and maps indicating areas for wheat, barley, idle land, flowed land, pasture land, nature vegetation, reforestation and others were prepared for each segment. A.R.H.

N82-19640# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
METHOD OF INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS TO VEGETATION
Joao Roberto dosSantos, Pedro Hernandez Filho, and Yosio Edemir Shimabukuro Aug. 1981 54 p refs In PORTUGUESE; ENGLISH summary
(INPE-2215-MD/010) Avail: NTIS HC A03/MF A01

The material provided for remote sensing training course on vegetation is presented. Studies using remote sensing products for characterization and mapping, inventory or management problems in forestry were reviewed in the literature. The methodology of visual or automatic interpretation of those most commonly used LANDSAT data products in forestry studies is described. Case studies in natural or reforested vegetation, which were carried out in INPE, are included with the basic information. A.R.H.

N82-19641# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
METHODOLOGY OF THE INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS IN PEDOLOGY
Mario Valerio Filho, Jose Carlos Neves Epiphanio, and Antonio Roberto Formaggio Aug. 1981 55 p refs In PORTUGUESE; ENGLISH summary
(INPE-2211-MD/008) Avail: NTIS HC A03/MF A01

A global view of photointerpretation techniques in soil survey is presented. Photopedologic methods are described which served as a base for the systematic approach to orbital data interpretation for soil survey. Several pedology research projects in Brazil are described. A.R.H.

N82-19642# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
METHODOLOGY OF THE INTERPRETATION OF REMOTE SENSING DATA AND APPLICATIONS IN GEOMORPHOLOGY
Tania Maria Sausen and Evlyn Marcia Leao deM. Novo Aug. 1981 42 p refs In PORTUGUESE; ENGLISH summary
(INPE-2209-MD/007) Avail: NTIS HC A03/MF A01

Remote sensing techniques not only permit the acquisition, in a short time, of a large volume of information about phenomena occurring at the Earth's surface, but also provide a constant flux of data showing variations in spatial distribution patterns, which is of value in predicting and controlling geomorphological events. The use of aerial panchromatic, color, and multispectral photography is discussed as well as the interpretation of radar and thermal infrared imagery. Methods for interpreting multispectral imagery from LANDSAT are examined. A.R.H.

N82-19643# Los Alamos Scientific Lab., N. Mex.
CONTINENTAL SCIENTIFIC DRILLING PROGRAM CURATORIAL NEEDS
Grant Heiken and Sue Goff Feb. 1981 300 p refs
(Contract W-7405-eng-36)
(LA-8726-MS) Avail: NTIS HC A13/MF A01

To circulate and protect cores, cuttings, and other samples produced during the continental scientific drilling program (CSDP), a uniform policy of curation must be established that addresses who receives the samples, curator's responsibilities, and standard procedures of description and handling of samples. Investigation of state laws dealing with the preservation of rock materials concludes that 46 of the 50 states do not have any regulations that would hinder a CSDP program from removing core and placing it in a national repository. Two of the remaining states require that only one-quarter of the core length remain with the state, while the other two may request the core but usually only ask for a representative sample. It is recommended that regional repositories be established at existing facilities and that the budget for curation be about five per cent of the budget for the total program. A.R.H.

N82-19644*# Business and Technological Systems, Inc., Seabrook, Md.
AN INFORMATION ADAPTIVE SYSTEM STUDY REPORT AND DEVELOPMENT PLAN
William S. Ataras, Kenneth Eng, John J. Morone, Paul R. Beaudet, and Roland Chin 9 May 1980 225 p
(Contract NAS5-25668)
(NASA-CR-166768; BTS-FR-80-117) Avail: NTIS HC A10/MF A01 CSCL 05B

The purpose of the information adaptive system (IAS) study was to determine how some selected Earth resource applications may be processed onboard a spacecraft and to provide a detailed preliminary IAS design for these applications. Detailed investigations of a number of applications were conducted with regard to IAS and three were selected for further analysis. Areas of future research and development include algorithmic specifications, system design specifications, and IAS recommended time lines. N.W.

N82-19645*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE EFFECT OF FINITE FIELD SIZE ON CLASSIFICATION AND ATMOSPHERIC CORRECTION
Yoram J. Kaufman and Robert S. Fraser Sep. 1981 53 p refs
(NASA-TM-83818) Avail: NTIS HC A04/MF A01 CSCL 20F

The atmospheric effect on the upward radiance of sunlight scattered from the Earth-atmosphere system is strongly influenced by the contrasts between fields and their sizes. For a given atmospheric turbidity, the atmospheric effect on classification of surface features is much stronger for nonuniform surfaces than for uniform surfaces. Therefore, the classification accuracy of agricultural fields and urban areas is dependent not only on the optical characteristics of the atmosphere, but also on the size of the surface do not account for the nonuniformity of the surface have only a slight effect on the classification accuracy; in other cases the classification accuracy descreases. The radiances above finite fields were computed to simulate radiances measured by a satellite. A simulation case including 11 agricultural fields and four natural fields (water, soil, savanah, and forest) was used to test the effect of the size of the background reflectance and the optical thickness of the atmosphere on classification accuracy. It is concluded that new atmospheric correction methods, which take into account the finite size of the fields, have to be developed to improve significantly the classification accuracy. Author

N82-19646*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.

ACTIVE MICROWAVE INVESTIGATION OF SNOWPACKS: EXPERIMENTAL DOCUMENTATION, COLORADO 1979-1980

W. H. Stiles, Fawwaz T. Ulaby, A. Aslam, and M. Abdelrazik Jul. 1981 188 p refs
(Grant NsG-5335)
(NASA-CR-166727; RSL-TR-410-3) Avail: NTIS HC A09/MF A01 CSCL 08L

During the winter of 1979-1980, the University of Kansas Microwave Active Spectrometer systems measured the backscattering properties of snowpacks under varying conditions at four test sites in Colorado. In addition to the radar data over 1-35 GHz, ground-truth measurements of the atmospheric, snow, and soil characteristics were obtained for each radar data set. The test sites, data acquisition procedures, and data that were acquired in this experiment are presented and described. Author

N82-19647*# Systematics General Corp., Sterling, Va.
GUIDELINES FOR SPACEBORNE MICROWAVE REMOTE SENSORS

Viqui Litman (Applied Media, Inc., Greenbelt, Md.) and John Nicholas Mar. 1982 87 p refs
(Contract NASw-3398)
(NASA-RP-1086) Avail: NTIS HC A05/MF A01 CSCL 14B

A handbook was developed to provide information and support to the spaceborne remote sensing and frequency management communities: to guide sensor developers in the choice of frequencies; to advise regulators on sensor technology needs and sharing potential; to present sharing analysis models and, through example, methods for determining sensor sharing feasibility; to introduce developers to the regulatory process; to create awareness of proper assignment procedures; to present sensor allocations; and to provide guidelines on the use and limitations of allocated bands. Controlling physical factors and user requirements and the regulatory environment are discussed. Sensor frequency allocation achievable performance and usefulness are reviewed. Procedures for national and international registration, the use of non-allocated bands and steps for obtaining new frequency allocations, and procedures for reporting interference are also discussed. M.D.K.

N82-19648# Deutsches Geodaetisches Forschungsinstitut, Munich (West Germany).
THE DIAGNOSIS SETTLEMENT 1980 OF THE GERMAN MAIN TRIANGULATION NETWORK. PART 2: TRAJECTORIES [DIE DIAGNOSEAUSGLEICHUNG 1980 DES DEUTSCHEN HAUPTDREICKSNETZES. 2: STRECKEN]

Rudolf Schmidt Frankfurt am Main Verlag des Instituts fuer Angewandte Geodaesie 1981 501 p refs In GERMAN
(SER-B-253-Mitt-159-Pt-2; ISSN-0071-9196) Avail: NTIS HC A22/MF A01

Diagnostic balancing in triangulation networks was investigated. The purpose of defining the network for diagnostic balancing is to reduce the balance of the edge effect. The computer program is based on observations of the geographic coordinates system. The following tasks were performed: compilation of results from end to end measurements; execution of end to end measurements in the triangulation network; reduction of field length; and, calculation of end to end measurements. E.A.K.

N82-19649# British Aerospace Dynamics Group, Stevenage (England). Space and Communications Div.
STUDY OF EARTH RESOURCES SATELLITE (ERS) DATA REDUCTION UNIT

C. J. Collins, comp., F. A. C. Burke, comp., J. W. Pengelly, comp., P. Redstone, comp. (Logica Ltd.), C. Burrows, comp. (Logica Ltd.), and N. McEvoy, comp. (Logica Ltd.) Paris ESA Aug. 1981 188 p refs
(Contract ESA-4415/80/NL-PP(SC))
(BAe-TP-7905; ESA-CR(P)-1478) Avail: NTIS HC A09/MF A01

Techniques for reducing onboard, by a factor of 4, the data rate from imaging instruments on Earth resources satellites, especially from the ocean color monitor on ERS 1, were examined. Theoretical analysis and simulation with real images allow algorithms to be defined for implementation assessment. A tradeoff based on performance and engineering criteria shows that spatial resolution degrading unit (SRDU) and a fixed weight spectral transform followed by a Rice Machine (FWST + RM2) meet reduction criteria within the mass and power constraints. Costs (two model program) are comparable, the greater complexity of FWST + RM2 being largely offset by more advanced technology in SRDU. Before either option is adopted, further simulation and breadboarding are recommended. Author (ESA)

N82-19650# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
SATELLITE SCATTEROMETER FEASIBILITY STUDY. VOLUME 1: TECHNICAL RESULTS Final Report

R. Anders, G. Bommas, W. Gieraths, W. Gilg, P. Hans, M. Haimerl, H. Hoelzl, A. Kuehnle, H. Schuessler, P. Stuerzenhofaecker et al Paris ESA Apr. 1981 194 p refs 2 Vol.
(Contract ESA-4367/80/F-DD(SC))
(ESA-CR(P)-1492-Vol-1) Avail: NTIS HC A09/MF A01

A scatterometer for ERS 1 is described. A wind sensor determines vector fields within a 400 km sweep parallel to satellite motion. Individual vectors are extractable from 50 X 50 km cells. Wind speeds between 4 and 24 m/sec are measured with an angular accuracy of + or - 20 deg. A wave sensor handles spectra between 100 and 1000 m wavelength. Measurements are taken with a spacing of 100 km or less along the satellite track. Data are extractable from 5 x 5 km resolution cells. Wind speed and wind direction measurements are derived from Seasat data and of two-dimensional ocean wave spectra measurement are derived from the synthetic aperture radar mode. Author (ESA)

N82-19651# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
SATELLITE SCATTEROMETER FEASIBILITY STUDY. VOLUME 2: DATA EXTRACTION ALGORITHM AND ERROR SIMULATION FOR WIND SENSOR Final Report

P. Hans Paris ESA Apr. 1981 100 p ref 2 Vol.
(Contract ESA-4367/80/F-DD(SC))
(ESA-CR(P)-1492-Vol-2) Avail: NTIS HC A05/MF A01

The ERS 1 scatterometer operation was computer simulated to: (1) test the Moore's relationship between the backscattering coefficient sigma deg and wind speed/direction; (2) investigate the influence of statistical errors in the sigma deg measurement on the resultant wind parameters; and (3) investigate antenna configurations with respect to functional performance and hardwear realization. Erroneous a sub zero parameter values in the radar sea return model cause errors mainly in wind speed, while erroneous a sub 2 causes errors in wind direction, and a sub 1 has little effect. The dual beam/dual polarization concept is recommended. Author (ESA)

N82-19652# Spar Aerospace Products Ltd., Toronto (Ontario).
STUDY OF A RADAR ALTIMETER FOR THE EUROPEAN REMOTE SENSING PROGRAM. VOLUME 1: EXECUTIVE SUMMARY

A. Thompson and S. J. Alexander Jun. 1981 90 p Prepared jointly with Dornier-Werke GmbH Friedrichshafen, West Germany
(Contract ESA-4427/80/F-DD(SC))
(Spar-R.1090-Issue-A; ESA-CR(P)-1502) Avail: NTIS HC A05/MF A01

Sea scattering, radar parameter selection, performance characteristics such as acquisition and tracking, and operation in rain and over land were studied in order to design a radar altimeter. Tradeoffs covering the antenna, microwave subsystem, signal processor, and altimeter controller were performed. A configuration consisting of a full deramp radar pulse compression system operating at 13.7 GHz, with a maximum likelihood estimator tracker/processor is chosen. The design meets the specification in all respects, has better performance and less weight than the Seasat altimeter, yet is fully redundant. A costed development plan completely compatible with the ERS 1 schedule is outlined. Author (ESA)

N82-19653# Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.
DEVELOPMENT OF A BREADBOARD COOLER FOR INFRARED REMOTE SENSING PAYLOADS, PHASE 1 Final Report

E. G. Overbosch and N. P. Enderberg Paris ESA 14 Mar.

1981 153 p
(Contract ESTEC-4484/80/NL-PP(SC))
(FOK-RV-R-81-064; ESA-CR(P)-1506) Avail: NTIS HC A08/MF A01

A multistage passive cryogenic cooler was designed for the ocean color monitor (OCM) for ERS 1. Mathematical models of thermal and mechanical behavior support the concept of a radiator located in a parabolic reflector. Technologically critical areas of the design are compared with corresponding components in the optical imaging instrument, i.e. the glass reinforced thermal insulation/suspension straps, the suspension system integrated in the cooler, the parabolic reflector, and the cold stage radiator. A set of critical components suitable for both coolers is feasible. A three stage breadboard cooler is described. The multilayer insulation (MLI) radiator cools the MLI support, the first stage cools the paraboloid. The second stage is the cold stage radiating its heat loads by the open faced honeycomb radiator to space. The suspension of the first stage consists of dummies representing the thermal behavior of the corresponding OCM straps. The outside mounting ring is sufficiently stiff to support the cooler, and is used for mounting the cooler in the test chamber. Author (ESA)

N82-19654# Engins Matra, Velizy (France). Lab. de Traitement des Images.

DATA RATE REDUCTION. IMPACT OF IMAGE DATA COMPRESSION ON END TO END DATA MANAGEMENT OF A MULTISPECTRAL PAYLOAD

G. E. Lowitz, J. M. Vivier, J. P. Camus, and B. H. Roy Paris ESA Jul. 1980 51 p refs
(Contract ESTEC-3749/78)
(Rept-44/130; ESA-CR(P)-1507) Avail: NTIS HC A04/MF A01

Satellite onboard data compression by clustering in the raw channels with a variable number of classes is discussed. The effect on the overall image chain is illustrated by land applications satellite system (LASS) data and LANDSAT ground stations processing and dissemination systems. Image quality, processing costs, software and hardware are considered. Onboard mechanization is efficient and the compression principles benefit user interpretation routines such as classification. Compressed data can be processed efficiently, yielding cost savings on the order of 100 to 1. A 512 X 512 pixel frame, including preprocessing, is treated in 5 min. The compressed imagery can be recognized, zones can be located and cloud cover can be assessed, making high quality quick looks possible. Author (ESA)

N82-19655# World Meteorological Organization, Geneva (Switzerland).

CASE STUDIES OF NATIONAL HYDROLOGICAL DATA BANKS (PLANNING, DEVELOPMENT AND ORGANIZATION)

1981 147 p refs
(WMO-576; OHR-17; ISBN-92-63-10576-6) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 10

Contributions from 14 countries on the planning, development, and organization of national hydrological data banks are included, with information on developing data archives for specific elements and on the broader concept of coordinated data banks. For each country the type of data bank (centralized, coordinated, or limited) and the status of hydrological data collection systems are indicated. Contributions to the operation of the data bank and the role and requirements of users are listed. The structure and organization of the data bank, the nature and composition of the hydrological information received, and data processing and quality control procedures are described. Case studies are presented for Australia, Brazil, Canada, Columbia, Finland, France, the Federal Republic of Germany, Morocco, New Zealand, Norway, Portland, Switzerland, the United Kingdom, and the United States of America. Author (ESA)

N82-19656# Saab-Scania, Linkoping (Sweden).

ON THE ACCURACY OF THERMAL INERTIA MAPPING BY INFRARED IMAGERY

Sune R. J. Axelsson 1981 20 p refs
(SAAB-REPR-AE-10) Avail: NTIS HC A02/MF A01

The influence of different interfering parameters on the estimation of the thermal inertia of the ground from the diurnal variations of the surface temperature, using thermal infrared and albedo measuring imagery, was investigated. The strong influence of these parameters degrades the accuracy of the analysis and makes the interpretation complex. This influence was studied, starting from an improved analytic model of the surface temperature of a periodically heated ground surface. The errors in albedo and atmospheric heat exchange, and the limited accuracy of sensors and the model used in data processing, dominate the thermal inertia error. Further reductions of the accuracy are due to the translation of the thermal inertia map into user data like soil type, porosity and soil moisture. Upper bounds on the potential thermal inertia mapping accuracy are found by calculating the estimation error when the interfering parameters are known with specified accuracy. Author (ESA)

N82-19657# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Lab.

IMPROVED ST. CLAIR RIVER DYNAMICS FLOW MODELS AND COMPARISON ANALYSIS

J. A. Derecki and R. N. Kelly May 1981 49 p refs
(PB82-119272; NOAA-81072407; NOAA-TM-ERL-GLERL-34; GLERL-CONTRIB-260) Avail: NTIS HC A03/MF A01 CSCL 08H

The St. Clair River dynamic flow models, modified to provide better channel definition, to include additional discharge measurements for model calibration, and to incorporate wind stress effects on river flows, are described and compared for daily flow differences resulting from channel definition improvements, wind effects, time scale effects, and a combination of these factors. All the St. Clair River models are derived for the upper river channel, spanning approximately one-third of the river. The three available models can be operated on hourly or daily time scales, with and without surface wind stress effects. During the winter, ice may affect the accuracy of flow computations and model differences may exceed 15% of daily flow. GRA

N82-19658# Geological Survey, Boston, Mass. Water Resources Div.

WATER RESOURCES DATA FOR NEW HAMPSHIRE AND VERMONT, WATER YEAR 1980 Annual Report, 1 Oct. 1979 - 30 Sep. 1980

Jun. 1981 186 p
(PB82-110156; USGS/WRD/HD-81/073; USGS-WDR-NH-VT-80-1) Avail: NTIS HC A09/MF A01 CSCL 08H

Water resources data for the 1980 water year for New Hampshire and Vermont are reported. Records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells are presented. Discharge records for 77 gaging stations, stage records for 3 lakes, monthend contents for 25 lakes and reservoirs, water quality data for 4 gaging stations, and water levels for 40 observation wells are included. Also included are data for 4 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements. A few pertinent stations (not included above) in bordering States and Province of Quebec are also included. GRA

N82-19659# Geological Survey, Richmond Va. Water Resources Div.

WATER RESOURCES DATA FOR VIRGINIA, WATER YEAR 1980 Annual Water Data Report

Jun. 1981 609 p refs
(PB82-113416; USGS/WRD/HD-81-040; USGS/WDR/VA-80-1) Avail: NTIS HC A99/MF A01 CSCL 08H

Records are presented for water discharge at 210 gaging stations, stage only at 1 gaging station, stage and contents at 10 lakes and reservoirs; water quality at 53 gaging stations and 120 wells; and water levels at 60 observation wells. Data are included for 63 crest stage partial record stations. Additional water data were collected at various sites not involved in the systematic data collection program. Discharge measurements were made at 142 coal monitoring partial record stations and at 67 low-flow partial record stations. Miscellaneous data were collected at 311 measuring sites and 186 water quality sampling sites. GRA

N82-19660# Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.
SOCIAL AND ENVIRONMENTAL CONSEQUENCES OF NATURAL RESOURCES POLICIES WITH SPECIAL EMPHASIS ON BIOSPHERE RESERVES Final General Technical Report
Peter F. Ffolliott (Arizona Univ., Tucson) and Gonzalo Halffter (Inst. of Ecology, Mexico) 22 Sep. 1981 63 p refs Seminar held at Durango, Mexico, 8-13 Apr. 1980
(PB82-113937; FSGTR/RM-88) Avail: NTIS HC A04/MF A01 CSCL 02F

A seminar to promote international cooperation among natural resources policy makers, scientists, and educators, within the framework of the international Man and the Biosphere Program is discussed. Papers on a variety of topics relating to natural resources policies formed a basis for formal and information discussions among the participants proceedings are discussed.
GRA

N82-19661# Scientific Service, Inc., Redwood City, Calif.
A MOBILE STREAM DIVERSION SYSTEM FOR HAZARDOUS MATERIALS SPILLS ISOLATION Final Report
James V. Zaccor Cincinnati EPA Sep. 1981 48 p
(Contract EPA-68-03-2458)
(PB82-109679; EPA-600/2-81-219) Avail: NTIS HC A03/MF A01 CSCL 08H

A prototype mobile system was designed and developed for quick diversion of a stream flow around a contaminated area. Spill scenarios were analyzed to stablish design criteria for a self contained, independent system that would maintain flow continuity around a region undergoing decontamination. Stock items available nationwide were used to provide easy maintenance and replaceability. The system was assembled as two independent units, mounted on trailers so that spills would be readily accessible via state or interstate highways. A quick unloading feature provides capability for air shipment to more distant locations. Once onsite, the system can be assembled and placed in operation by a crew of five in a matter of hours. Unit operation and ability to deliver a flow rate of 0.35 cu m/s a distance of 0.3 km over unprepared ground were evaluated in a shakedown test.
GRA

N82-19662# Geological Survey, Harrisburg, Pa. Water Resources Div.
WATER RESOURCES DATA FOR PENNSYLVANIA, WATER YEAR 1980: VOLUME 2: SUSQUEHANNA AND POTOMAC RIVER BASINS Annual Water-date Report, 1 Oct. 1979 - 30 Sep. 1980
Apr. 1981 363 p refs Prepared in cooperation with Pennsylvania Dept. of Environmental Resources
(PB82-115908; USGS/WRD/40-80/062; USGS/WDR/PA-80-2) Avail: NTIS HC A16/MF A01 CSCL 08H

Water resources data for the 1980 water year for Pennsylvania consist of records of discharge and water quality of streams; contents of lakes and reservoirs; and water levels of ground-water wells. Records for water discharge at 100 stations, contents at 13 lakes and reservoirs, water quality at 35 gaging stations, and water levels at 25 observation wells are included. Also included are data for 21 crest stage, 15 low-flow, and 129 water-quality partial-record stations.
GRA

N82-19663# Bureau of Mines, Twin Cities, Minn. Research Center.
IN SITU MINING RESEARCH. PROCEEDINGS OF BUREAU OF MINES TECHNOLOGY SEMINAR Information Circular, 1981
Jul. 1981 114 p refs Seminar held in Denver, 5 Aug. 1981
(PB82-104753; BM-IC-8852; LC-81-607050) Avail: NTIS HC A06/MF A01 CSCL 08I

An overview of the in situ mining research currently being carried out by the Bureau of Mines is presented with emphasis on the environment and productivity. Topics covered include the restoration of ground water, the selection of lixiviants, in situ mining of commodities other than uranium, in situ mining costs, the application of resistance measurements to in situ mining, an acid leach mining case history, and the use of branched boreholes for in situ mining. A bibliography on in situ mining is appended.
GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-19664 Department of Energy, London (England). Transport Working Group.
REVIEW OF THE UK TRANSPORT ENERGY OUTLOOK: AND POLICY RECOMMENDATIONS
1981 43 p refs
(EP-47; ACEC-Paper-11) Copyright. Avail: Issuing Activity; HMSO £4 + postage, PHI

Liquid fuel consumption for transport (excluding international bunkers for ships) in 1979 is analyzed and used to forecast the position at the end of the century. Car population is expected to increase by 6 million to over 20 million, but fuel saving designs mean that fuel consumption increases only slightly. Truck fuel consumption stays the same. Fuel consumption by UK airlines is expected to double. The proportion of a barrel of crude oil which is refined as transport fuel must be increased.
Author (ESA)

N82-19665 Department of Energy, London (England). Buildings Working Group.
ENERGY CONSERVATION IN THE PRODUCTION OF DOMESTIC HOT WATER
1981 23 p refs
(EP-48; ACEC-Paper-12) Copyright. Avail: Issuing Activity; HMSO £2.80 + postage, PHI

Improvements in energy efficiency in existing buildings and the construction of energy efficient buildings are discussed with emphasis on water heating. Cost effective measures proposed include fitting an 80-mm insulating jacket to the hot water storage cylinder, using time switches, fitting thermostatic control systems to boiler based central heating, and storing domestic hot water at a lower temperature. Research into the recovery of heat from waste water, the use of cold water detergents, and the use of heat pumps is urged.
Author (ESA)

N82-19666 Department of Energy, London (England). Severn Barrage Committee.
TIDAL POWER FROM THE SEVERN ESTUARY, VOLUME 1
1981 125 p refs Original contains color illustrations 2 Vol.
(EP-46-Vol-1; ISBN-0-11-410916-8) Copyright. Avail: Issuing Activity; HMSO £9.80 + postage, PHI

Environmental, energy, and economic factors associated with building a tidal power barrage in the Bristol channel were studied. An ebb generation scheme is recommended since it minimizes the unit cost of electricity generation and has less effect on ports than flood or two way generation. The economic justification for a barrage depends on factors which are not known when the decision on whether to build is taken, e.g., the extent of nuclear generation, or the price of coal in the first third of the next century. Further study of the environmental consequences of the barrage is required. An inner barrage is recommended since the larger output of an outer barrage does not outweigh engineering, environmental and economic disadvantages.
Author (ESA)

N82-19667 Department of Energy, London (England). Severn Barrage Committee.
TIDAL POWER FROM THE SEVERN ESTUARY. VOLUME 2: ANALYSIS, STUDIES, REPORTS AND EVALUATIONS

1981 470 p refs 2 Vol.
(EP-46-Vol-2; ISBN-0-11-410919-2) Copyright. Avail: Issuing Activity; HMSO £ 19.50 + postage, PHI

Environmental, energy, and economic factors associated with building a barrage in the Bristol channel were studied. Data collection and analysis are described. Sites, configurations, and costs are considered. Turbine caissons, sluice caissons, and hydroelectric plant are treated. Embankments, navigation and locks are discussed. Environmental, social, industrial, and economic impact are evaluated. An inner barrage, ebb generation scheme is recommended. Author (ESA)

N82-19668*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
CHARACTERIZATION OF ASEC BSR 2 OHM-cm SILICON SOLAR CELLS WITH DIELECTRIC WRAPAROUND CONTACTS AS A FUNCTION OF TEMPERATURE AND INTENSITY
A. F. Whitaker and S. A. Little Dec. 1981 18 p refs
(NASA-TM-82456) Avail: NTIS HC A02/MF A01 CSCL 10A

Twenty high performance BSR 2 ohm-cm silicon solar cells manufactured by ASEC were evaluated at 1 AU conditions and at low temperature and low intensities representative of deep space. These cells showed evidence of series resistance of 1 AU conditions and approximately 50% had reduced power outputs under deep space conditions. Average efficiency of these cells was 12.4% of 1 AU conditions of 1 SC/+25 C. Author

N82-19669*# Arizona State Univ., Tempe.
SOCIOECONOMIC IMPACT OF PHOTOVOLTAIC POWER AT SCHUCHULI, ARIZONA Final Report
Donald Bahr, Billy G. Garrett, and Carolyn Chrisman Oct. 1980 161 p refs
(Contracts DEN3-50; DE-AI01-79ET-20485)
(NASA-CR-165551; DOE/NASA/0050-1) Avail: NTIS HC A08/MF A01 CSCL 10A

The social and economic impact of photovoltaic power on a small, remote native American village is studied. Village history, group life, energy use in general, and the use of photovoltaic-powered appliances are discussed. No significant impacts due to the photovoltaic power system were observed. R.J.F.

N82-19670*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PHOSPHORIC ACID FUEL CELL TECHNOLOGY STATUS
Stephen N. Simons, Robert B. King, and Paul R. Prokopius 1981 20 p refs Presented at Fuel Cells: Technol. Status and Appl., Chicago 16-18 Nov. 1981; sponsored by Institute of Gas Technology
(Contract DE-AI01-80ET-17088)
(NASA-TM-82791; DOE/NASA/17088-3) Avail: NTIS HC A02/MF A01 CSCL 10A

A review of the current phosphoric acid fuel cell system technology development efforts is presented both for multimegawatt systems for electric utility applications and for multikilowatt systems for on-site integrated energy system applications. Improving fuel cell performance, reducing cost, and increasing durability are the technology drivers at this time. Electrodes, matrices, intercell cooling, bipolar/separator plates, electrolyte management, and fuel selection are discussed. B.W.

N82-19671*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MECHANISM AND MODELS FOR ZINC METAL MORPHOLOGY IN ALKALINE MEDIA
Charles E. May and Harold E. Kautz Dec. 1981 36 p refs
(NASA-TM-82768; E-1090) Avail: NTIS HC A03/MF A01 CSCL 10A

Based on experimental observations, a mechanism is presented to explain existence of the different morphologies of electrodeposited zinc in alkaline solution. The high current density dendrites appear to be due to more rapid growth on the nonbasal crystallographic planes than on the basal plane. The low current density moss apparently results from dissolution from the nonbasal planes at low cathodic voltages. Electrochemical models were sought which would produce such a phenomenon. The fundamental plating mechanism alone accounts only for different rates on different planes, not for zinc dissolution from a plane in the cathodic region. Fourteen models were explored; two models were in accord with the proposed mechanism. One involves rapid disproportionation of the zinc +1 species on the nonbasal planes. The other involves a redox reaction (corrosion) between the zinc-zincate and hydrogen-water systems. S.L.

N82-19672*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PERFORMANCE AND OPERATIONAL ECONOMICS ESTIMATES FOR A COAL GASIFICATION COMBINED-CYCLE COGENERATION POWERPLANT
Joseph J. Nainiger, Raymond K. Burns, and Annie J. Easley Mar. 1982 32 p refs
(NASA-TM-82729; E-1032) Avail: NTIS HC A03/MF A01 CSCL 10B

A performance and operational economics analysis is presented for an integrated-gasifier, combined-cycle (IGCC) system to meet the steam and baseload electrical requirements. The effect of time variations in steam and electrial requirements is included. The amount and timing of electricity purchases from sales to the electric utility are determined. The resulting expenses for purchased electricity and revenues from electricity sales are estimated by using an assumed utility rate structure model. Cogeneration results for a range of potential IGCC cogeneration system sizes are compared with the fuel consumption and costs of natural gas and electricity to meet requirements without cogeneration. The results indicate that an IGCC cogeneration system could save about 10 percent of the total fuel energy presently required to supply steam and electrical requirements without cogeneration. Also for the assumed future fuel and electricity prices, an annual operating cost savings of 21 percent to 26 percent could be achieved with such a cogeneration system. An analysis of the effects of electricity price, fuel price, and system availability indicates that the IGCC cogeneration system has a good potential for economical operation over a wide range in these assumptions. R.J.F.

N82-19673*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OPERATIONAL PERFORMANCE OF THE PHOTOVOLTAIC-POWERED GRAIN MILL AND WATER PUMP AT TANGAYE, UPPER VOLTA Summary Report, Mar. 1979 - Apr. 1981
James E. Martz, Anthony F. Ratajczak, and Richard DeLombard Feb. 1982 59 p refs Sponsored in part by Bureau for Development Support
(NASA-TM-82767; E-1089) Avail: NTIS HC A04/MF A01 CSCL 10B

The first two years of operation of a stand alone photovoltaic (PV) power system for the village of Tangaye, Upper Volta in West Africa are described. The purpose of the experiment was to demonstrate that PV systems could provide reliable electrical power for multiple use applications in remote areas where local technical expertise is limited. The 1.8 kW (peak) power system supplies 120-V (d.c.) electrical power to operate a grain mill, a water pump, and mill building lights for the village. The system was initially sized to pump a part of the village water requirements from an existing improved well, and to meet a portion of the village grain grinding requirements. The data, observations, experiences, and conclusions developed during the first two years of operation are discussed. Reports of tests of the mills used in the project are included. B.W.

N82-19674*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE GEOTHERMAL PROBABILISTIC COST MODEL WITH AN APPLICATION TO A GEOTHERMAL RESERVOIR AT HEBER, CALIFORNIA
Lowell H. Orren, G. Michael Ziman, and Sue Campbell Jones 15 Dec. 1981 70 p refs
(Contracts NAS7-100; DE-AI03-79ET-37116)
(NASA-CR-168641; DOE/ET-37116/1; JPL-Pub-81-117) Avail: NTIS HC A04/MF A01 CSCL 10A

A financial accounting model that incorporates physical and institutional uncertainties was developed for geothermal projects. Among the uncertainties it can handle are well depth, flow rate, fluid temperature, and permit and construction times. The outputs of the model are cumulative probability distributions of financial

measures such as capital cost, levelized cost, and profit. These outputs are well suited for use in an investment decision incorporating risk. The model has the powerful feature that conditional probability distribution can be used to account for correlations among any of the input variables. The model has been applied to a geothermal reservoir at Heber, California, for a 45-MW binary electric plant. Under the assumptions made, the reservoir appears to be economically viable. Author

N82-19675*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A REVIEW OF THE SALT-GRADIENT SOLAR POND TECHNOLOGY
E. I. H. Lin 30 Jan. 1982 60 p refs
(Contracts NAS7-100; DE-AI03-81SF-11552)
(NASA-CR-168635; JPL-Pub-81-116; JPL-5107-3; DOE/SF-11552/1) Avail: NTIS HC A04/MF A01 CSCL 10A

The state of the salt-gradient solar pond technology is reviewed. Highlights of findings and experiences from existing ponds to data are presented, and the behavior, energy yield, operational features, and economics of solar ponds are examined. It is concluded that salt-gradient solar ponds represent a technically feasible, environmentally benign, and economically attractive energy producing alternative. In order to bring this emerging technology to maturity, however, much research and development effort remains to be undertaken. Specific R&D areas requiring the attention and action of technical workers and decision-makers are discussed, both from the perspectives of smaller, thermally-oriented ponds and larger, electricity generating ponds. Author

N82-19676*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
VACUUM LAMINATION OF PHOTOVOLTAIC MODULES
D. R. Burger 15 Jan. 1982 22 p refs
(Contracts NAS7-100; DE-A101-76ET-20356)
(NASA-CR-168634; DOE/JPL-1012-32; JPL-Pub-81-118; JPL-5101-188) Avail: NTIS HC A02/MF A01 CSCL 10A

Vacuum lamination of terrestrial photovoltaic modules is a new high volume process requiring new equipment and newly develop materials. Equipment development, materials research, and some research in related fields and testing methods are discussed. Author

N82-19677*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A LOW-POWER PHOTOVOLTAIC SYSTEM WITH ENERGY STORAGE FOR RADIO COMMUNICATIONS: DESCRIPTION AND DESIGN METHODOLOGY
C. P. Chapman, Paul D. Chapman (Everest and Jennings, Los Angeles), and Alvin H. Lewison (Simpson Electric Co., Elgin, Ill.) 15 Jan. 1982 73 p refs
(Contracts NAS7-100; DE-A101-76ET-20356)
(NASA-CR-168640; JPL-Pub-82-2) Avail: NTIS HC A04/MF A01 CSCL 10B

A low power photovoltaic system was constructed with approximately 500 amp hours of battery energy storage to provide power to an emergency amateur radio communications center. The system can power the communications center for about 72 hours of continuous nonsun operation. Complete construction details and a design methodology algorithm are given with abundant engineering data and adequate theory to allow similar systems to be constructed, scaled up or down, with minimum design effort. Author

N82-19678*# Naval Weapons Support Center, Crane, Ind. Weapons Quality Engineering Center.
RESULTS OF CONTINUOUS SYNCHRONOUS ORBIT TESTING OF SEALED NICKEL-CADMIUM CELLS
J. D. Harkness 1 Jun. 1981 472 p refs
(NASA Order S-53742-AG)
(NASA-CR-168564; WQEC/C-81-120A) Avail: NTIS HC A20/MF A01 CSCL 10C

Test results from continuous synchronous orbit testing of sealed nickel cadmium cells are presented. The synchronous orbit regime simulates a space satellite maintaining a position over a fixed point on earth as the earth rotates on its axis and revolves about the sun. Characteristics of each lot of cells, test conditions, and charge control methods are described. E.A.K.

N82-19679# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
NEW BIOREACTORS FOR AEROBIC PROCESSES
K. Schuegerl 1982 44 p refs Transl. into ENGLISH from Chem. Ing. Tech., (West Germany), v. 52, no. 12, 1980 p 951-905 Presented at Dechema Ann. Meeting, Frankfurt am Main, 18 Jun. 1980
(ISSN-0077-5606; NRC/CNR-TT-2005) Avail: NTIS HC A03/MF A01

The best known bioreactors are classified into three types and described according to the method of introducing energy. All these reactors consist of few constructional units, of which only the dispersion systems will be considered. In all the dispersion units, gas dispersion in the range of interest in practice is by a turbulent mechanism. Thus the dispersion units can be compared directly with one another. It is shown that the efficiency of the dispersion units depends upon the properties of the turbulence generated thereby. B.W.

N82-19680*# McDonnell-Douglas Corp., St. Louis, Mo.
THE NASA STANDARD 20 AMPERE HOUR NICKEL-CADMIUM BATTERY MANUAL
D. A. Webb 29 Jun. 1979 70 p refs
(Contract NAS5-23844)
(NASA-CR-166700; MMS-408-2101-0003) Avail: NTIS HC A04/MF A01 CSCL 10C

The NASA standard 20 ampere hour spacecraft nickel-cadmium battery in described. Mechanical electrical and thermal data are supplied. Both qualification and acceptance tests are described. Information on handling and storage is given. R.J.F.

N82-19681# Advanced Engineering Lab., Salisbury (Australia). Defence Research Centre.
FEASIBILITY STUDY ON A LOW POWER VERTICAL AXIS WIND-POWERED GENERATOR
W. R. Crook, T. Puust, M. L. Robinson, and L. J. Vencel Sep. 1980 102 p refs
(AEL-0039-TR; AR-001-672) Avail: NTIS HC A06/MF A01

Investigations carried out to establish a design concept for a 1 kW wind-powered generator suitable for use as an alternative power source in isolated locations is described. Design criteria include high power to weight ratio, simplicity of assembly, and potential for fixed, mobile or portable applications. A suitable configuration using a Darrieus straight blade rotor with a microprocessor based control system is proposed. Information on the power output to be expected in different wind environments is provided. Author

N82-19682*# Talandic Research Corp., Pasadena, Calif.
[EVALUATION OF CRYSTAL OSCILLATORS AND FREQUENCY DIVIDERS FOR HIGH TEMPERATURE OPERATION] Final Report
1 Jun. 1981 18 p refs Prepared for JPL
(NASA Order IC-727859)
(NASA-CR-168561; JPL-9950-554) Avail: NTIS HC A02/MF A01 CSCL 10A

Active and passive components of crystal oscillators and frequency dividers were tested to determine their performance at temperatures from 300 C to 350 C. The properties of GaAs JFETs were determined and their performance compared with that of silicon devices. Techniques for constructing breadboard circuits were assessed for operation in this temperature range. A Pierce oscillator and a multivibrator (Colorado crystal) oscillator were constructed and tested. Device failures are discussed. A.R.H.

N82-19683# New Mexico State Univ., Las Cruces.
DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN REGIONS WITH COLD CLIMATE, VOLUME 1 Preliminary Report, Apr. 1980 - Sep. 1981
Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 123 p refs 5 Vol.
(Contract N62583-79-MR-585)
(AD-A108382; CEL-CR-82.002-Vol-1) Avail: NTIS

HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with cold climate. GRA

N82-19684# New Mexico State Univ., Las Cruces.

DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN EAST COAST REGIONS WITH TEMPERATE CLIMATE, VOLUME 2 Preliminary Report, 1980 - Sep. 1981

Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 117 p refs 5 Vol.

(Contract N62583-79-MR-585)

(AD-A108383; CEL-CR-82.003-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in East Coast regions with temperate climate. GRA

N82-19685# New Mexico State Univ., Las Cruces.

DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN REGIONS WITH WARM, HUMID CLIMATE, VOLUME 3 Preliminary Report, Apr. 1980 - Sep. 1981

Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 132 p refs 5 Vol.

(Contract N62583-79-MR-585)

(AD-A108384; CEL-CR-82.004-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in regions with warm, humid climate. GRA

N82-19686# New Mexico State Univ., Las Cruces.

DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN THE PACIFIC NORTHWEST, VOLUME 4 Preliminary Report, Apr. 1980 - Sep. 1981

Monika Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 120 p refs 5 Vol.

(Contract N62583-79-MR-585)

(AD-A108385; CEL-CR-82.005-Vol-4) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in the Pacific Northwest. GRA

N82-19687# New Mexico State Univ., Las Cruces.

DESIGN CALCULATION PROCEDURE FOR PASSIVE SOLAR HOUSES AT NAVY INSTALLATIONS IN WARM CALIFORNIA CLIMATES, VOLUME 5 Preliminary Report, Apr. 1980 - Sep. 1981

Monika Lumsdaine and Edward Lumsdaine Port Hueneme, Calif. NCEL Oct. 1981 121 p refs 5 Vol.

(Contract N62583-79-MR-385)

(AD-A108386; CEL-CR-82.006) Avail: NTIS HC A06/MF A01 CSCL 13/1

A 'worksheet' approach is used in that the user may work through an example passive solar design by following the text in the report. Included are tables for heating degree days, solar heat gains, building R factors, orientation factors, roof overhang designs, etc. Performance is calculated on a monthly basis. The reports are presented for five geographical regions with content and text format similar, differing only in the appropriate regional factors. This volume gives appropriate designs for Navy installations in warm California climates. GRA

N82-19688# Solarex Corp., Rockville, Md.

DESIGN OF MOBILE PHOTOVOLTAIC POWER SYSTEMS: 0.5-3kW Final Report

Roy D. Gibson 1 Oct. 1981 133 p

(Contract DAAK70-80-C-0147)

(AD-A108889) Avail: NTIS HC A07/MF A01 CSCL 10/2

This contract effort can be summarized by four technical tasks: Task 1 - Analysis of Engine-Generator Inventory and Use for a less than 5 kW system; Task 2 Parametric analysis of the Transportability of Photovoltaic System, i.e., the range of size and weight of transportable trailers and the associated PV generator size; Task 3 - Preliminary Cost Estimates for Photovoltaic Systems, and Task 4 - Preliminary Photovoltaic System Design. This report presents the results of Task 1 for the engine generator set planned inventory and characteristics. Task 1 also contained candidate photovoltaic system configurations which would be compared with the engine-generator characteristics identified in Task 1. A parametric study was made of sizing trade-offs between photovoltaic arrays and battery storage capacities which were capable of at least meeting the identified engine-generator characteristics and on structural designs for the photovoltaic array and storage battery for the two trailer configurations. The preliminary cost estimate support in Task 3 involved life cycle cost analysis for the system sizes studied in Task 1. The Task 4 preliminary system design support consisted of examining the results of Tasks 1, 2 and 3 and determining characteristics of transportable photovoltaic systems. GRA

N82-19689# General Electric Co., Philadelphia, Pa. Energy Systems Programs Dept.

DESIGN AND FABRICATION OF CONTAINMENT RINGS FOR USE IN TESTS OF SIX PROTOTYPE FLYWHEEL ROTORS

Anthony P. Coppa Feb. 1981 106 p refs

(DE81-030357; UCRL-15370) Avail: NTIS HC A06/MF A01

The design of containment rings for use in the prototype flywheel rotor test was examined. Rotor dynamics and failure characteristics were measured. Six designs for prototypes for containment rings are identified. The all metallic and kevlar overwrapped metallic linear containment designs are compared. E.A.K.

N82-19690# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Abteilung Energietechnik.

DEVELOPMENT OF SIMPLE SOLAR COLLECTORS Final Report

Wilmar Fuhse, Karl Jaeger, and Hans-Peter Kleinemeier Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 314 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-174; ISSN-0340-7608) Avail: NTIS HC A14/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 47,90

The feasibility of simplifying solar energy systems, and the production techniques of their components, for usage in developing countries was investigated. The emphasis in those countries should not be so much on efficiency. Simplicity of construction and minimal reliance on imported components should be emphasized rather than efficiency because of favorable radiation conditions and high ambient temperatures. Several systems were tested consisting only of collectors, heat storage and a simple flow control. The construction of the collectors was reviewed for materials, heat vector, efficiency, construction and assembly techniques, and the material resources and climate of individual

countries. As a result, a prototype collector was built and tested, satisfying the requirements. Author (ESA)

N82-19691# Friedrichsfeld G.m.b.H., Mannheim (West Germany). Steinzeug- und Kunststoffwerke.

PRODUCTION TECHNOLOGY OF AN OXYGEN ION CONDUCTIVE CERAMIC FOR HIGH TEMPERATURE FUEL CELLS AND HIGH TEMPERATURE WATER ELECTROLYSIS Final Report

Guenther Heimke, Helmut Mayer, and Arno Reckziegel Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 104 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-180; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,85

The cheap mass production of stabilized zirconia ceramic bodies with thin walls, suitable for high temperature fuel cell or water electrolysis applications is discussed. Chemical and thermal corrosion effects were laboratory tested. Such bodies sintered from YZ03-YbZ03 and YZ03 doped zirconia with high density, good electrical conductivity, small grain size, and 5 mm wall thickness can be produced by conventional methods at temperatures > 1700 C. Extremely fine grained structure ceramics of almost theoretical density can be produced at 1600 C using coprecipitated powders. These powders are, however, too expensive for mass production. Author (ESA)

N82-19692# Dortmund Univ. (West Germany). Inst. fuer Umweltschutz.

A SOLAR HIGH TEMPERATURE KILN Final Report

Norbert Huettenhoelscher and Konrad Bergmann Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 93 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-181; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,75

The feasibility of using solar energy in developing countries for baking ceramic construction materials was investigated. The solar high temperature kiln is described. It uses two parabolic concentrators which direct available radiation into the baking chamber. The Sun tracker has only one axis. Preliminary test results with the prototype kiln were satisfactory. Author (ESA)

N82-19693# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

JOINT INDIAN-GERMAN PROGRAM ON SOLAR ENERGY: PHASE 2 Final Report

Knut Berndorfer Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 99 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-182; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21

Based on the analysis of the total energy needs of a typical Indian village and of the local sources: sun, wind and biomass, several energy supply concepts were analyzed. A project proposal for short and long-term development and testintg of components and systems was elaborated. Test results and experience with the 10 kW solar power plant of Madras are presented, including recommendations for further work regarding low temperature systems. The work carried out on a parabolic dish test stand at Hyderabad is reported. Author (ESA)

N82-19694# Fraunhofer-Inst. fuer Systemtechnik und Innovationsforschung, Karlsruhe (West Germany).

EXAMINATION OF HEAT STORAGE IN SOIL Final Report, Dec. 1980

Fredy Jaeger, Juergen Reichert, and Hermann Herz Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 154 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-200; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,90

The performance of a heat storage system, based on soil storage by spherical temperature stratification, was assessed and compared to conventional hot water systems for usage in single family houses heated by solar energy. A heat conduction code was used in combination with a simulation model for solar room heating systems in order to evaluate the dependence of storage performance on soil materials, heat transfer parameters, and storage size. Results show that the initially suggested storage scheme should be supplemented with insulation in order to perform somewhat better than hot water storage. A more definite assessment requires further studies on transmission losses, heat capacity enlargement, and mechanical stability and aging properties of insulation materials. Author (ESA)

N82-19695# Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.

A PITCH CONTROL SYSTEM FOR LARGE SCALE WIND TURBINES

Brad S. Liebst 12 Jan. 1981 146 p refs Sponsored in cooperation with Aeronautical Research Foundation Prepared in cooperation with MIT

(Contract NE-5061-014)

(FFA-TN-HU-2262-Pt-6) Avail: NTIS HC A07/MF A01

A pitching blade segment control system, to alleviate problems associated with wind shear, tower shadow, and gravity, like shortened lifetime and noise generation was designed. The classical linear quadratic Gaussian optimal regulator approach is used in the control formulation. An aerodynamic analysis, incorporating wind shear and tower shadow, is performed. An equivalent hinge model describes the turbine structural dynamics. Pitch, flap and lag blade degrees of freedom and shaft torsion and generator dynamics are included. It is shown that the system reduces vibration and noise, provides a cleaner power signal, improves gust response, and increases annual energy output.

Author (ESA)

N82-19696# Technical Research Centre of Finland, Espoo. Lab. of Building Economics.

ENERGY PROPERTIES IN URBAN BUILDING STOCK

Veikko Kanerva and Markku Lappalainen 1981 35 p refs Sponsored by Ministry of Trade and Industry and National Housing Board

(VTT-RR-1/B1; ISBN-951-38-1236-7; ISSN-0358-5069) Avail: NTIS HC A03/MF A01

Buildings in urban areas were examined for energy consumption and energy conservation potential. Oil is 75% of heating fuel. Over 30% of the overall building volume heated is served by district or regional heating. The annual consumption of heating energy in buildings fluctuates between 30 and 140 kW hr/cu m. Function, size, and maintenance patterns affect energy consumption. Interior temperature levels and ventilation account for much of the dispersion in consumption values. Older buildings consume less energy per unit volume than those erected after 1960. Buildings constructed since 1975 consume over 10% less energy than the average. It is concluded that it is possible to reduce energy consumption within cost-effective limits in urban building stock by one third during the 1980's. Author (ESA)

N82-19697# Commerce Dept., Washington, D.C. Economic Policy Staff.

US ENERGY FOR THE REST OF THE CENTURY Annual Report

Joseph F. Gustaferro 2 Jul. 1981 36 p

(PB82-115866) Avail: NTIS HC A03/MF A01 CSCL 10A

The basic quantitative results of U.S. Commerce Department forecasting efforts in the energy area are summarized. The data cover the entire spectrum of U.S. energy requirements and focus on the end-use of energy for operational purposes, e.g. highway transportation, space heating, lighting, and road construction. The tables provide data on fuel consumption by types and BTU content for 1980 and as projected for the year 2000. GRA

N82-19698# Science Research Council, Chilton (England).

THE TECHNIQUES, MAGNITUDES AND OPPORTUNITIES FOR DEVELOPMENT OF ENERGY STORAGE (UK)

F. M. Russell 1981 13 p

(PB82-120858; RL-80-087) Copyright. Avail: NTIS HC A02/MF A01 CSCL 10C

The development of energy storage techniques is discussed.

Opportunities for development of existing and new forms of energy storage are examined. The increase in energy transformation with increasing industrialization the need for efficient energy storage and recovery also grows. The large scale transformation of chemical energy stored in fossil fuels emphasizes the need for energy conversion. Techniques of energy storage, applications, and possible research and development areas are also discussed. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-19699 Delaware Univ., Newark.
DETRITAL EXCHANGE PROCESSES OF A DELAWARE SALT MARSH Ph.D. Thesis
Charles True Roman 1981 156 p
Avail: Univ. Microfilms Order No. 8128345

Quantitative and qualitative aspects of detrital exchange between the 190-hectare Canary Creek salt marsh and lower Delaware Bay were studied on a seasonal basis. An accurate assessment of water volume flux was obtained from detailed hydrographic measurements of cross-sectional velocity patterns. Hourly field collections over three consecutive tidal cycles revealed ebbtide concentrations of particulate organic carbon and nitrogen to be higher than flood during all seasons, except during winter icing conditions. Mean ebbtide dissolved organic carbon concentrations were greater than floodtide during all seasons. An equivalent of 16% of the aboveground primary production of this Spartina-dominated system was exported as particulate organic carbon, with 31% flushed to coastal waters as dissolved organic carbon. Meteorological events are undoubtedly dominant forces controlling marsh/estuarine material exchange processes. Dissert. Abstr.

N82-19700 Emory Univ., Atlanta, Ga.
THE EFFECTS OF SULFUR DIOXIDE AND ACID PRECIPITATION ON DECOMPOSITION AND NUTRIENT CYCLING PROCESSES Ph.D. Thesis
Marlin Ralph Gottschalk 1981 112 p refs
Avail: Univ. Microfilms Order No. 8129855

Terrestrial microcosms (intact soil cores) from an oak-hickory forest on the Piedmont Plateau in Georgia were used to ascertain the impact of sulfur dioxide and acid precipitation on decomposition and nutrient cycling processes. Changes in carbon dioxide efflux and soil leachate nutrient concentrations were measured to detect systems level functional responses to the experimental stresses. Nutrient export increased significantly over a 40 week calibration period because of increased decomposition and nitrification and subsequent soil acidification. Soil leachate concentrations of Ca, Mg, K and NO3-N increased asymptotically from 1.4, 2.0, 3.9 and 0.3 mu g/ml (ppm), respectively, to 53.1, 33.5, 26.0 and 110.7 ppm after about 32 weeks. Ammonium N concentrations peaked at 5.0 ppm at week 18 and then declined significantly. Phosphate P concentrations remained relatively constant at 0.020 to 0.040 ppm. Leachate pH decreased from 5.0 to 4.0. Dissert. Abstr.

N82-19701 International Institute for Applied Systems Analysis, Laxenburg (Austria).
LIFE ON A WARMER EARTH: POSSIBLE CLIMATIC CONSEQUENCES OF MAN MADE GLOBAL WARMING
H. Flohn 1981 80 p refs
(ER-3) Copyright. Avail: Issuing Activity

The interaction between energy and climate is explored, including the impact on global climate of three main energy sources: solar, nuclear and fossil fuels. The global warming problem is introduced. Comprehensive analogies with warmer times are made. From the best models available, the future global average surface temperature is found and modified, describing the global warming effects caused by greenhouse effect caused by gases other than carbon dioxide, released into the atmosphere by man, i.e. nitrous oxide, methane, ammonia, and the chlorofluoromethanes. Paleoclimatic scenarios are reviewed, showing possible effects of global warming. An 800 to 1100 ppm CO2 concentration causes irreversible Arctic melting, leading to displacement of present climatic zones by 400 to 800 km. Author (ESA)

N82-19702 International Institute for Applied Systems Analysis, Laxenburg (Austria).
OPERATIONAL WATER QUALITY MANAGEMENT: BEYOND PLANNING AND DESIGN
M. B. Beck 1981 84 p refs
(ER-7) Copyright. Avail: Issuing Activity

Effective means of water quality management is discussed. The theory, practice, and the changing character of problems related to water pollution are considered. Current practice in each of the subsystems of a water quality management system is reviewed. The desirable attributes of water quality management and recommendations for realizing the full potential of operational management are noted. Author (ESA)

N82-19703# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THREE DIMENSIONAL NUMERICAL MODEL FOR ESTIMATION OF POLLUTANT CONCENTRATION M.S. Thesis - 12 Dec. 1980 [MODELO NUMERICO TRIDIMENSIONAL PARA ESTIMATIVA DE CONCENTRACAO DE POLUENTES]
Nelson Arai Aug. 1981 76 p refs In PORTUGUESE; ENGLISH summary
(INPE-2193-TDL/060) Avail: NTIS HC A05/MF A01

The pollution concentration in a region with wind velocities less than 1 m/s was studied by a three dimensional numerical dispersion model. The model calculates the three dimensional concentration distribution which results from emission of pollutant from a continuous source. The Gaussian Plume formulation is used to calculate wind velocities greater than 1 m/s. It is suggested that these models may be used as a first approximation to estimate pollutant concentration. E.A.K.

N82-19704# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PRELIMINARY RESULTS OF A STUDY OF MAPPING THERMAL DISCHARGE IN THE OCEAN, USING REMOTE SENSING DATA
Merritt Raymond Stevenson, Carlos Alberto Steffen, and Hector Manual Inostroza Villagra Sep. 1981 23 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981
(INPE-2229-PRE/021) Avail: NTIS HC A02/MF A01

The spatial and temporal variations of the sea surface temperature, utilizing data obtained from sea surface, aircraft and satellite platforms were studied. The objective of the study is the evaluation and mapping of small scale variations in the sea surface temperature, caused by the thermal discharge from a nuclear power plant at Angra dos Reis, Brazil. Evaluation of data from ANGRA 01, the first experiment made on December 19, 1980, showed the surface temperature to be quite isothermal. Temperature from the aircraft and satellite radiometers were about 0.6 C and 5.0 C cooler, respectively, than the temperatures measured from the boat. These thermal offsets are readily accounted for by differences in emissivities of the sea surface and the intervening water vapor in the lower atmosphere.Author

N82-19705# Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
BINARY MOSAICS AND POINT QUADRAT SAMPLING IN ECOLOGY M.S. Thesis
Cajo J. F. terBraak Sep. 1980 108 p refs
(A-80-ST-96-37) Avail: NTIS HC A06/MF A01

Point quadrat sampling, a method for estimating the proportional cover of a plant species over a planar region whereby the presence or absence of the species is recorded at each of N samples points is discussed. If n is the number of points at which the species is present, p = n/N is unbiased for p. Expressions for the variance of circumflex p are given for a random sample of sample points independently and uniformly distributed over a region, a systematic sample of points in a rectangular lattice covering the region, and a frame sample of small randomly located frames, each with m points regularly spaced along a line or in a square lattice. The efficiency of systematic sampling and frame sampling with respect to random

sampling is evaluated for two classes of underlying mosaic processes. A map showing the incidence of heather and the locations of pines on a 10m x 20m area in Central Sweden is analyzed to test for association between pine and heather. N.W.

N82-19706# Committee on Foreign Affairs (U. S. House).
UNITED STATES-CANADIAN RELATIONS AND ACID RAIN
Washington GPO 1981 123 p refs Hearing before the Subcomm. on Human Rights and Intern. Organ. and the Subcomm. on Inter-Am. Affairs of the Comm. on Foreign Affairs, 20 May 1981
(GPO-80-995) Avail: Subcommittee on Human Rights and International Organizations

United States and Canadian relations are discussed in the context of the problem of acid rain and its effects on the environment. Legislation to control exhaust emissions is discussed. R.J.F.

N82-19707*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF REPETITION RATE AND IMPULSIVENESS OF SIMULATED HELICOPTER ROTOR NOISE ON ANNOYANCE
Clemans A. Powell and David A. McCurdy Feb. 1982 59 p refs
(NASA-TP-1969; L-14936) Avail: NTIS HC A04/MF A01 CSCL 20A

Annoyance judgements were obtained for computer generated stimuli simulative of helicopter impulsive rotor noise to investigate effects of repetition rate and impulsiveness. Each of the 82 different stimuli was judged at 3 sound pressure levels by 48 subjects. Impulse repetition rates covered a range from 10 Hz to 115 Hz; crest factors covered a range from 3.2 dB to 19.3 dB. Increases in annoyance with increases in repetition rate were found which were not predicted by common loudness or annoyance metrics and which were independent of noise level. The ability to predict effects of impulsiveness varied between the noise metrics and was found to be dependent on noise level. The ability to predict the effects of impulsiveness was not generally improved by any of several proposed impulsiveness corrections. Instead, the effects of impulsiveness were found to be systematically related to the frequency content of the stimuli. A modified frequency weighting was developed which offers improved annoyance prediction. Author

N82-19708# Mississippi State Univ., Mississippi State. Agriculture and Experiment Station.
VEGETATIVE EROSION CONTROL STUDIES TENNESSEE-TOMBIGBEE WATERWAY Final Report, 3 Aug. 1976 - 30 Oct. 1980
Jeffrey V. Krans, Clifford Trammel, Richard Harrod, and Veronica Henning Jan. 1981 139 p
(Contract DACW62-76-C-0216)
(AD-A108318) Avail: NTIS HC A07/MF A01 CSCL 08/13

Vegetative erosion control studies of establishment, overseeding, and refertilization were conducted at two sites in Tishomingo CO., MS (Yellow Creek Port Site and Tennessee-Tombigbee Waterway Site) that were most representative of the Tenn-Tom Waterway slopes and spoil areas from August, 1976 thru October 1980. Primary objectives were focused on species selection, seeding rates, mulch evaluations, post-establishment fertilization and overseeding. Species shown to be well adaptive to site and soil conditions are given. Comparison of seeding rates, mixtures, and seed distribution methods were made. Overseeding was also performed. Cultivation practices of burning, discing, and clod-busting were evaluated with clod-busting being the most effective method. Regrowth of the established stand following overseeding and plant response to nitrogen fertilization were also evaluated. GRA

N82-19709# Stadtwerke Bocholt G.m.b.H., (West Germany).
PRELIMINARY STUDY ON THE SUPPLY OF INDUSTRIAL WATER BY ADVANCED TREATMENT OF WASTE WATER DISCHARGED FROM A SEWAGE TREATMENT PLANT Final Report
Dietmar Wallisch Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 81 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-205; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,95

The reuse of waste water in closed circuit as industrial water after centralized treatment, but without passage through the soil, was studied for application in a newly developed industrial area which includes a sewage treatment plant. The quality of the water discharged from the sewage plant and the factors influencing it the requirements for industrial water and the economics of the processing were studied. Results show that, although the waste waters allow further cleaning, it is impossible to fix standards for industrial waters. In order to prove economic feasibility, a test on a semi-industrial scale is planned. Author (ESA)

N82-19710# Donohue and Associates, Inc., Sheboygan, Wis.
SMALL SCALE RECLAMATION/DISPOSAL OF TOXIC PORCELAIN ENAMELING WASTE SLUDGES Final Report
Karl G. Voelkel Feb. 1981 69 p refs
(Grant NSF ISP-80-09922)
(PB82-101593; NSF/ISP-81013) Avail: NTIS HC A04/MF A01 CSCL 13B

The technical, economic, and legal feasibility of various onsite methods for reclaiming or disposing of wastes containing hazardous metals generated in the manufacture of porcelain enameled (PE) aluminum ware is determined. Results indicate that (1) PE waste stream pretreatment with polyelectrolyte polymers is advantageous in generating both sludges and clear supernatants that conform to current regulatory standards for normal disposal and subsequent treatment as nonhazardous wastes; and (2) commercial encapsulation methods are not economical for many PE ball room mill waste streams. Acid extraction of metals from sludges with subsequent metal salt recovery by ion exchange/distillation appears economically feasible for dry overspray sludges from the spray booth. Author (GRA)

N82-19711# Franklin Research Center, Philadelphia, Pa.
LITERATURE STUDY OF THE BIODEGRADABILITY OF CHEMICALS IN WATER. VOLUME 1: BIODEGRADABILITY PREDICTION, ADVANCES IN CHEMICAL INTERFERENCES WITH WASTEWATER TREATMENT Final Report, Jul. 1979 - Apr. 1981
John Geating Cincinnati EPA Sep. 1981 248 p refs 2 Vol.
(Grant EPA-R-806699)
(PB82-100843; EPA-600/2-81-175-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 13B

Biodegradability productions and advances in chemical interferences with wastewater treatment were studied. It is indicated that 93% accuracy for biodegradables, but only 70% for nonbiodegradables. Technological advances in wastewater treatment are reported. In the same selection, in tabular format, are references to commercial literature and some journal articles, supplied with this reports to EPA, obtained by canvassing Japanese and West German manufacturers in this field. A condensation of abstracts from the 1913-1974 literature dealing only with adverse effects of chemicals on wastewater treatment, in tabular format is included. It is intended to complement references to this topic in the permutated index. GRA

N82-19712# Franklin Research Center, Philadelphia, Pa.
LITERATURE STUDY OF THE BIODEGRADABILITY OF CHEMICALS IN WATER. VOLUME 2: PERMUTATED INDEX OF CHEMICALS, MICROBIAL POPULATIONS, AND WASTEWATER TREATMENT SYSTEMS WITH BIBLIOGRAPHY Final Report, Jul. 1979 - Apr. 1981
Cincinnati EPA Sep. 1981 157 p refs 2 Vol.
(Grant EPA-R-806699)
(PB82-100850; EPA-600/2-81-176-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 13B

Post 1974 literature on wastewater treatment was retrieved by online searching of eight databases. Six hundred articles were used to generate a three tiered permutated index keyed to, and presented with the 600 article bibliography; the three levels of the index are name of chemical, name of microbe affecting or affected by said chemical, and treatment process involved. These

articles were used to generate separate biodegradable and nonbiodegradable lists of chemicals, on which a feasibility study was carried out to create an algorithm to predict biodegradability using only substructural fragments and molecular weight. GRA

N82-19713# Dufresne-Henry, Inc., North Springfield, Vt.
AN INEXPENSIVE BIOLOGIC METHOD OF UPGRADING LAGOON EFFLUENT, PHASE 1: SMALL BUSINESS INNOVATIVE RESEARCH PROGRAM
Gordon Richardson Pyper Feb. 1981 81 p refs
(Grant NSF ISP-80-09414)
(PB82-101072; NSF/ISP-81003) Avail: NTIS HC A05/MF A01 CSCL 13B

The use of fresh water mussels to treat and upgrade wastewater lagoon effluent by filtering suspended solids and lowering the biological oxygen demand (BOD) is evaluated. The mussels were introduced to domestic waste effluent to (1) test their tolerance to environmental loading factors such as suspended solids, BOD, and heavy metals; (2) define their ability to remove the solids and BOD; (3) develop prototype data; and (4) formulate a cost and efficiency model for a tertiary lagoon. Lampsilis radiata were cultured in secondary lagoon wastewater effluent using continuous flow fields. Suspended solids and BOD changes were evaluated for several organic and hydraulic loadings. Heavy metals, dissolved oxygen, pH, BOD, chemical oxygen demand, stress, and space needs were determined. GRA

N82-19714# Minnesota Dept. of Transportation, St. Paul. Office of Research and Development.
WATER POLLUTION FROM HIGHWAYS AND URBAN AREAS: AN ANNOTATED BIBLIOGRAPHY (SUPPLEMENT) Final Report, 1979 - 1980
Duane M. Zwiers Feb. 1981 21 p
(PB82-113317; FHWA/MN-81/3) Avail: NTIS HC A02/MF A01 CSCL 08H

An annotated bibliography was carried out in 1978 to determine what publications are available that deal with water pollution from highways and urban areas. Approximately 112 citations are presented. GRA

N82-19715# Tennessee Valley Authority, Norris. Office of Natural Resources.
REMOTE SENSING OF SULFUR DIOXIDE EFFECTS ON VEGETATION. VOLUME 1: SUMMARY Final Report, 1976 - 1980
C. Daniel Sapp Washington EPA Jul. 1981 33 p 2 Vol.
(PB82-115122; TVA/ONR/ARP-81/5-Vol-1; EPA-600/7-81-113) Avail: NTIS HC A03/MF A01 CSCL 06F

Three techniques for detecting and mapping sulfur dioxide (SO2) effects on the foliage of sensitive crops and trees near large, coal fired power plants were tested. These techniques used are spectroradiometry, photometric analysis of aerial photographs, and computer analysis of airborne multispectral scanner data. Airborne multispectral scanner data covering affected soybean fields were analyzed using three computer assisted procedures. GRA

N82-19716# Tennessee Valley Authority, Norris. Office of Natural Resources.
REMOTE SENSING OF SULFUR DIOXIDE EFFECTS ON VEGETATION. VOLUME 2: DATA Final Report, 1976 - 1980
C. Daniel Sapp Washington EPA Jul. 1981 284 p refs 2 Vol.
(PB82-115130; TVA/ONR/ARP-81/6-Vol-2; EPA-600/7-81-114) Avail: NTIS HC A13/MF A01 CSCL 06F

Techniques for detecting and mapping sulfur dioxide (SO2) effects on foliage of sensitive crops and trees near large coal fired power plants were calculated. The techniques are: laboratory spectroradiometry field spectroradiometry; interpretation and analysis of aerial photographs; analysis of multispectral scanner data. GRA

N82-19717# Najarian, Thatcher and Associates, Closter, N.J.
UPPER CHESAPEAKE BAY SALINITY STUDY
Tavit O. Najarian, Dong-Ping Wang, and M. Llewellyn Thatcher Jul. 1981 70 p refs Sponsored by Maryland Dept. of Natural Resources
(PB82-116641; PPSP/PPRP-51) Avail: NTIS HC A04/MF A01 CSCL 13B

The influences of different forcing mechanism on the circulation and salt distribution in the Chesapeake Bay and in its tributary estuaries are described. Specifically, the study analyzes the variation of salinity distribution in the upper Bay during low freshwater discharges from the Susquehanna River, and when Chesapeake and Delaware Canal flows are predominately in the westward direction. The investigations are centered around the exercise of two different models; one and two dimensional (in the vertical plant). GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-19718 Houston Univ., Tex.
THREE-DIMENSIONAL MIGRATION VELOCITY ANALYSIS IN THE SPACE-FREQUENCY DOMAIN Ph.D. Thesis
Thomas Richard Morgan 1981 133 p
Avail: Univ. Microfilms Order No. 8129730

Through the use of general techniques of image formation, two algorithms that yield both optimum velocity for migration, and strike and dip parameters is presented. The formation and evaluation of acoustic images is of prime importance to the methods employed. The particular images of interest are the source image for field gathers and the common reflection 'point' for common midpoint gathers. Through the use of two forms of the Rayleigh Sommerfield diffraction formula, acoustic images for these types of recordings are formed for a range of parameters (velocity, dip, and strike), the image of highest intensity corresponding to the 'best fit' set of trial parameters. Both algorithms operate in the temporal frequency domain and present new methods for frequency domain velocity and dip analysis and direct extraction or strike information. Dissert. Abstr.

N82-19719 California Univ., Berkeley.
ONE AND TWO DIMENSIONAL PHOTOCHEMICAL MODELING OF THE TWO CHEMICAL INTERACTIONS IN THE MIDDLE ATMOSPHERE (0-120 km) Ph.D. Thesis
Susan Solomon 1981 276 p
Avail: Univ. Microfilms Order No. 8200281

Photochemical modeling studies of the middle atmosphere are described, with particular emphasis on the photochemistry of the nitrogen oxides, their production in the lower thermosphere, and possible transport to the stratosphere. A one-dimensional photochemical model which treated the troposphere and stratosphere was extended to include the mesosphere and lower thermosphere. This model was used to study the ion and neutral chemistry of charged particle precipitation events. The production of NO and OH by such events and their effects on atmospheric ozone in the stratosphere and mesosphere are described. A two-dimensional model was also extended to treat the lower thermosphere and mesosphere, as well as the stratosphere and troposphere. The effect of this large additional source of stratospheric NO from upper atmospheric phenomena on both stratospheric ozone and NO was found to be substantial using presently accepted photochemistry. Dissert. Abstr.

N82-19720 British Library Lending Div., Boston Spa (England).
STRATOSPHERIC OZONE CONCENTRATION MEASUREMENTS AT SUNRISE AND AT SUNSET
P. Aimedieu 18 Mar. 1981 8 p refs Transl. into ENGLISH from Acad. of Sci., C.R., (Paris) no. 288, Ser. B p 89-92
(BLL-Trans-1499-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

In situ ozone measurements were taken at dawn and at dusk with a stratospheric ozonometer using gas phase chemiluminescence. Ozone is constant at the 19 and 5 mb (26 and 36 km) levels. At 2.5 mb (42 km) there is a rapid drop of about 5% at sunrise. In situ investigation of turbulent stratospheric transport

with the aid of the ozonometer employs Kolmogorov's theory, supposing, in particular, that the ozone concentration is locally stationary on the time-scale of the measurement. Evidence is provided that supports passive tracer for the low stratosphere on the time-scale of one day. It shows, however, that in the production regions rapid fluctuations are observed at sunrise.
B.W.

N82-19721 British Library Lending Div., Boston Spa (England).
GEOPHYSICAL EFFECTS ON THE LENGTH OF THE SIDERAL DAY
W. Rudloff 18 Dec. 1980 17 p refs Transl. into ENGLISH from Deut. Hydrogr. Z. (West Germany), v. 16, 1963 p 76-85 (BLL-Trans-1489-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The monthly variation of the length of the day $dl/dt = L$ was computed using the deviation of the length of the day L. The shearing forces, the atmospheric forces acting on the globe, solar radiation, the tropical atmospheric circulation, the sub-polar westerlies in the Southern Hemisphere, and the turning force of the roaring fortiers are considered.
N.W.

N82-19722 Institut d'Aeronomie Spatiale de Belgique, Brussels.
SOME ASPECTS OF THE SOLAR RADIATION INCIDENT AT THE TOP OF THE ATMOSPHERES OF MERCURY AND VENUS
E. vanHemelrijck and J. Vercheval 1981 35 p refs Submitted for publication
(Aeronomica-Acta-A-236-1981) Avail: Issuing Activity

A formalism was developed for the calculation of the insolation on the planets Mercury and Venus neglecting any atmospheric absorption. For Mercury, the instantaneous insolation curves are repeated in a two-tropical year cycle, the distribution of the solar radiation being perfectly symmetric between both hemispheres. In addition to latitudinal variations, a longitudinal effect expessed by different instantaneous insolation distributions during the course of time is observed; on the equator, the relative diurnal insolation variability may attain a factor of 3. The small obliquity of Venus results in a nearly symmetric solar radiation distribution with respect to the equator except at the poles where an important seasonal effect is found. No longitudinal dependence exists. The insolation curves are repeated in a nearly half year cycle.
Author (ESA)

N82-19723* Institut d'Aeronomie Spatiale de Belgique, Brussels.
THEORY OF THE AURORAL MAGNETOSPHERE
Michael Schulz, U. T. Chiu, and J. M. Cornwall 1981 18 p refs Presented at Auroral Workshop, Oulu, Finland, 17-20 Aug. 1980 Submitted for publication Co-sponsored by NSF and Belgian National Foundation for Scientific Research
(Contract NASW-3434)
(Aeronomica-Acta-A-237-1981) Avail: Issuing Activity

The boundary layer just inside the magnetospheric surface, which consists of magnetopause and neutral sheet, forms the auroral oval which is a region of reversal for the meridional component of the magnetospheric convection electric field. The parallel electric field produces upgoing ion beams and precipitating electron beams in the afternoon-evening sector of local time, and accounts for the polarity of Region 1 currents as a function of local time. Region 2 currents result from the need to conserve current despite the diminution of ionospheric electric field with decreasing latitude. The strength of the parallel electric field, and consequently of all related auroral phenomena, depends on the reconnection efficiency with which the interplanetary (solar wind) electric field penetrates into the magnetosphere.
Author (ESA)

N82-19724 Institut d'Aeronomie Spatiale de Belgique, Brussels.
SOLAR IRRADIANCE RETWEEN 120 AND 400 mm AND ITS VARIATIONS
Paul C. Simon 1981 41 p refs Presented at 14th ESLAB Symp., Scheveningen, Netherlands, 16-19 Sep. 1980 Submitted for publication
(Aeronomica-Acta-A-238-1981) Avail: Issuing Activity

The solar ultraviolet irradiance measurements in the wavelength range from 120 to 140 mm were compared. It is shown that important discrepancies exist between the irradiance values deduced from the most recent observations. The possible variations of the solar ultraviolet irradiance with the 27 day rotation period of the Sun and with the 11 year activity cycle are presented and discussed on the basis of the available irradiation fluxes obtained during the rising phase of solar cycle 21. It is found that the spectral features of both kinds of variation are related to the solar atmospheric layer from which the corresponding radiation is emitted.
Author (ESA)

N82-19725# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IONOSPHERIC IRREGULARITIES IN LOW LATITUDES OF THE AMERICAN SECTOR Ph.D. Thesis
Yukitaka Nakamura Oct. 1981 124 p refs In PORTUGUESE; ENGLISH summary
(INPE-2243-TDL/065) Avail: NTIS HC A06/MF A01

The atomic oxygen airglow emission at the wavelength of 6300 A observed at Cachoeira Paulista with frequently occurring perturbations intensity which propagate from north to south and from west to east was analyzed. Irregularities originated in the ionospheric F region and occur essentially during the premidnight period. Perturbations occur frequently during spring and summer and are rare during winter and fall. The disturbances are correlated with range type spread F detected over Cachoeira Paulista, and have characteristics similar to equatorial ionospheric plasma bubbles. The evolution of the bubble as a function of the electron density profile and as a function of the amplitude of the initial density perturbation was studied. The bubble is assumed to be aligned with the earth magnetic field and extending from higher altitudes at the equatorial region down to the arbitrary height of 150 km. Airglow calculation show that as the bubble goes up, the disturbances in the airglow intensity propagate from north to south.
E.A.K.

N82-19726# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ASSOCIATION BETWEEN IRREGULARITIES CAUSED IONOSPHERIC BUBBLES AND AIRGLOW PERTURBATIONS IN LOW LATITUDES IN BRAZIL [ASSOCIACAO ENTRE IRREGULARIDADES CAUSADAS POR BOLHAS IONOSFERICAS E PERTURBACOES DE LUMINESCENCIA EM BAIXAS LATITUDES NO BRAZIL]
Jose Humberto A. Sobral, M. A. Abdu, C. J. Zamlutti, and I. S. Batista Jun. 1981 10 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2122-RPE/346) Avail: NTIS HC A02/MF A01

Meridional profiles of OI 6300 A nightglow emission measured using a scanning photometer over Cachoeira Paulista, a low latitude station, often show propagating patches of airglow disturbances with north to south and west to east velocity components, occurring mostly in the premidnight period. Measurements carried out during a period of 26 months since January 1978, show significant seasonal dependence in the occurrence of these disturbances, with most of the events occurring in the spring-summer months and with very rare occurrence during the winter solstice. The north to south propagation velocities lie in the range of 150 to 350 m/s. A case by case comparison of the occurrences of these airglow disturbances with simultaneous ionograms over Cachoeira Paulista show that almost the totality of these disturbances are accompanied by strong range type echoes in the ionograms and vice versa. These results therefore support our earlier contention that these types of airglow disturbances might be manifestations of the equatorial plasma bubbles.
Author

N82-19727*# Alaska Univ., Fairbanks. Geophysical Inst.
KINETIC RESPONSE OF IONOSPHERIC IONS TO ONSET OF AURORAL ELECTRIC FIELDS
Y. T. Chiu (Aerospace Corp., El Segundo) and J. R. Kan El Segundo, Calif. Aerospace Corp. 27 Jul. 1981 38 p refs (Contract NASw-3434)
(NASA-CR-164799; ATR-81(7951)-3) Avail: NTIS HC A03/MF A01 CSCL 04A

By examining the exact analytic solution of a kinetic model of collisional interaction of ionospheric ions with atmospheric neutrals in the Bhatnagar-Gross-Krook approximation, we show that the onset of intense auroral electric fields in the topside ionosphere can produce the following kinetic effects: (1) heat

the bulk ionospheric ions to approximately 2 eV, thus driving them up to higher altitudes where they can be subjected to collisionless plasma processes; (2) produce a non-Maxwellian superthermal tail in the distribution function; and (3) cause the ion distribution function to be anisotropic with respect to the magnetic field with the perpendicular average thermal energy exceeding the parallel thermal energy. Author

N82-19728# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

CORRECTION FOR ATMOSPHERIC EFFECTS IN SATELLITE IMAGES [CORRECAO DE EFEITOS ATMOSFERICOS EM IMAGENS DE SATELITE]

Luiz Alberto Vieira Dias, Antonio Eduardo Costa Pereira, Gilberto Camara Neto, and Juan Jose Verdesio Bentancourt Nov. 1981 11 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2281-PRE/059) Avail: NTIS HC A02/MF A01

An algorithm to minimize the atmospheric effect on satellite images is presented. The equation L = L sub i x T + L sub p is used, where L, L sub i and L sub p are, respectively, the radiances: as measured by the satellite, intrinsic of the target, and that of the path; and T is the atmospheric transmittance. In the proposed method, the image is transformed to one for standard conditions, and T and L sub p are calculated a priori on tables. This makes the algorithm very fast and user friendly. M.G.

N82-19729*# New York State Univ., Albany.

INTEGRATED AND SPECTRAL ENERGETICS OF THE GLAS GENERAL CIRCULATION MODEL

J. Tenenbaum [1982] 51 p refs Submitted for publication
(Grant NsG-5077)
(NASA-CR-166766) Avail: NTIS HC A04/MF A01 CSCL 04A

Integrated and spectral error energetics of the GLAS General circulation model are compared with observations for periods in January 1975, 1976, and 1977. For two cases the model shows significant skill in predicting integrated energetics quantities out to two weeks, and for all three cases, the integrated monthly mean energetics show qualitative improvements over previous versions of the model in eddy kinetic energy and barotropic conversions. Fundamental difficulties remain with leakage of energy to the stratospheric level, particularly above strong initial jet streams associated in part with regions of steep terrain. The spectral error growth study represents the first comparison of general circulation model spectral energetics predictions with the corresponding observational spectra on a day by day basis. The major conclusion is that eddy kinetics energy can be correct while significant errors occur in the kinetic energy of wavenumber 3. Both the model and observations show evidence of single wavenumber dominance in eddy kinetic energy and the correlation of spectral kinetics and potential energy. Author

N82-19730*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ASSESSMENT OF THE FIRST RADIANCES RECEIVED FROM THE VSSR ATMOSPHERIC SOUNDER (VAS) INSTRUMENT

Dennis Chesters, Louis W. Uccellini, Harry Montgomery, Anthony Mostek (Computer Sciences Corp., Silver Spring, Md.), and Wayne Robinson (Computer Sciences Corp., Silver Spring, Md.) 10 Aug. 1981 134 p refs
(NASA-TM-83827) Avail: NTIS HC A07/MF A01 CSCL 04A

The first orderly, calibrated radiances from the VAS-D instrument on the GOES-4 satellite are examined for: image quality, radiometric precision, radiation transfer verification at clear air radiosonde sites, regression retrieval accuracy, and mesoscale analysis features. Postlaunch problems involving calibration and data processing irregularities of scientific or operational significance are included. The radiances provide good visual and relative radiometric data for empiricially conditioned retrievals of mesoscale temperature and moisture fields in clear air. S.L.

N82-19731*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

INFORMATION THEORY LATERAL DENSITY DISTRIBUTION FOR EARTH INFERRED FROM GLOBAL GRAVITY FIELD

David Parry Rubincam Oct. 1981 64 p refs Submitted for publication
(NASA-TM-83825) Avail: NTIS HC A04/MF A01 CSCL 08N

Information Theory Inference, better known as the Maximum Entropy Method, was used to infer the lateral density distribution inside the Earth. The approach assumed that the Earth consists of indistinguishable Maxwell-Boltzmann particles populating infinitesimal volume elements, and followed the standard methods of statistical mechanics (maximizing the entropy function). The GEM 10B spherical harmonic gravity field coefficients, complete to degree and order 36, were used as constraints on the lateral density distribution. The spherically symmetric part of the density distribution was assumed to be known. The lateral density variation was assumed to be small compared to the spherically symmetric part. The resulting information theory density distribution for the cases of no crust removed, 30 km of compensated crust removed, and 30 km of uncompensated crust removed all gave broad density anomalies extending deep into the mantle, but with the density contrasts being the greatest towards the surface (typically + or 0.004 g cm 3 in the first two cases and + or - 0.04 g cm 3 in the third). None of the density distributions resemble classical organized convection cells. The information theory approach may have use in choosing Standard Earth Models, but, the inclusion of seismic data into the approach appears difficult. Author

N82-19732*# Woods Hole Oceanographic Institution, Mass.

GRAVITY AND GEOID ANOMALIES OF THE PHILIPPINE SEA: EVIDENCE ON THE DEPTH OF COMPENSATION FOR THE NEGATIVE RESIDUAL WATER DEPTH ANOMALY

Carl Bowin [1982] 27 p refs
(Grant NAG5-18)
(NASA-CR-168639; WHOI-4931) Avail: NTIS HC A03/MF A01 CSCL 08G

A negative free-air gravity anomaly which occurs in the central part of the Philippine Sea was examined to determine the distribution and nature of possible regional mass excesses or deficiencies. Geoid anomalies from GEOS-3 observation were positive. A negative residual geoid anomaly consistent with the area of negative free-air gravity anomalies were found. Theoretical gravity-topography and geoid-topography admittance functions indicated that high density mantle at about 60 km dept could account for the magnitudes of the gravity and residual geoid anomaly and the 1 km residual water depth anomaly in the Philippine Sea. The negative residual depth anomaly may be compensated for by excess density in the uppermost mantle, but the residual geoid and regional free-air gravity anomalies and a slow surface wave velocity structure might result from low-density warm upper mantle material lying beneath the zone of high-density uppermost mantle. From a horizontal disk approximation, the depth of the low-density warm mantle was estimated to be on the order of 200 km. M.D.K.

N82-19733*# Woods Hole Oceanographic Institution, Mass.

UPPER MANTLE HETEROGENEITY: COMPARISONS OF REGIONS SOUTH OF AUSTRALIA WITH PHILIPPINE BASIN

Final Technical Report

[1982] 16 p refs
(Grant NAG5-18; NAG5-8)
(NASA-CR-168646) Avail: NTIS HC A02/MF A01 CSCL 08G

The nature of mass anomalies that occur beneath the regions of negative residual depth anomalies were identified. Residual geoid anomalies with negative residual depth anomalies are identified in the Philippine Basin (negative) and in the region south of Australia (positive and negative). In the latter region the geoid anomalies are eastward and the depth anomaly is northeast. It is suggested that the negative depth anomaly and the compensating mass excess in the uppermost mantle developed in the Eocene as the lithosphere of the west Philippine basin formed. Heating of the deeper upper mantle which causes slow surface wave velocities and negative gravity and geoid anomal-

ies may be a younger phenomenon which is still in progress.
E.A.K.

N82-19734*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL, VOLUME 2. APRIL 1979 TO OCTOBER 1979
M. Patrick McCormick, Helen M. Steele (Systems and Applied Sciences Corp., Hampton, Va.), and Patrick Hamill (Systems and Applied Sciences Corp., Hampton, Va.) Mar. 1982 78 p refs
(NASA-RP-1088-Vol-2; L-15120) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is abroad the Earth orbiting Nimbus 7 spacecraft proving extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature profiles for the time and place of each SAM II measurement (April 29, 1979, to October 27, 1979) is presented. Contours of aerosol extinction as a function of altitude and longitude or time were plotted and weekly aerosol optical depths were calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 micron for the time period were 1 to 3 $\times$ 10 to the -4th power km -1 in the main stratospheric aerosol layer. Optical depths for the stratosphere were about 0.002. Polar stratospheric clouds at altitudes between the tropopause and 20 km were observed during the Antarctic winter at various times and locations. A ready-to-use format containing a representative sample of the second 6 months of data to be used in atmospheric and climatic studies is presented. M.D.K.

N82-19735# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
A SIMULATION STUDY TO TEST THE PREDICTION OF 1 DEG TIMES 1 DEG MEAN GRAVITY ANOMALIES USING LEAST SQUARES COLLOCATION FROM THE GRAVSAT MISSION
Dhaneshwar P. Hajela Hanscom AFB, Mass. AFGL Sep. 1981 62 p refs
(Contract F19628-79-C-0027; AF Proj. 2309)
(AD-A108867; Rept-316; SCIENTIFIC-9; AFGL-TR-81-0302) Avail: NTIS HC A04/MF A01 CSCL 08/5

The purpose of this simulation study was to test the accuracy of prediction of mean gravity anomalies from the GRAVSAT mission, to establish the resolution achievable in terms of anomaly block size, and to draw conclusions for the data requirement for economical processing in terms of computer time. It was found that though the estimates of the formal standard deviation of the predicted 1 deg anomalies were reduced with the increase in size of the data cap, and with the increase in the density of data inside the cap, there was little improvement in the predicted value of 1 deg anomalies by least squares collocation technique. Besides, there was a large increase in the computer time required for the processing of the increased data. GRA

N82-19736# Atmospheric Radiation Consultants, Acton, Mass.
INVERSION OF SPIRE NO DATA
A. S. Zachor, R. D. Sharma, R. M. Nadile, and A. T. Stair, Jr. 20 Aug. 1981 36 p refs
(Contract F19628-79-C-0139; AF Proj. 7670)
(AD-A108866; SR-2; AFGL-TR-81-0325) Avail: NTIS HC A03/MF A01 CSCL 04/1

An algorithm was developed to invert spectrally resolved Earth limb radiance profiles. It is applicable in the nonequilibrium altitude regime for species/tangent heights that correspond to the optically thin condition. It was used to infer vertical distributions of temperature and excited NO density from data measured by SPIRE (the Spectral Infrared Rocket Experiment) in the NO fundamental band near 5.3 microns. The solution for excited NO density was used to compute atmospheric radiative cooling rates for the 5.3 microns band and the de-excitation rate constant k0 for the reaction NO + 0 yields NO + 0. The results are in good agreement with previously published values.
Author (GRA)

N82-19737# Colorado Univ. at Boulder.
A MEASUREMENT OF LONG TERM TILT IN COLORADO AND WYOMING Final Report, 6 Dec. 1977 - 31 May 1981
J. Christopher Harrison and Judah Levine 1 Sep. 1981 49 p refs
(Contract F19628-78-C-0065; AF Proj. 2309)
(AD-A108865; AFGL-TR-81-0304) Avail: NTIS HC A03/MF A01 CSCL 14/2

We have developed a borehole tiltmeter capable of operating for long periods of time at tidal sensitivity, and we have developed six of these tiltmeters at two sites near Boulder, Colorado. The data from the tiltmeters are recorded using a data acquisition and control system capable of recording the data from a large number of widely spaced instruments linked to a central site by means of telephone lines or radio links. We have also written analysis software to examine the power spectra of the tilt records, to extract the tidal admittance from time series and to evaluate the coherence between different instruments as a function of frequency. We have used our tilt array to measure the amplitude and phases of the major components of the earth tides, and we have examined the time dependence of the tidal admittance. We also have some preliminary estimates of the coherence between independent instruments at periods longer than one day. Author (GRA)

N82-19738# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.
A SURVEY OF ATMOSPHERIC TURBULENCE CHARACTERISTICS
Dorothy A. Stewart 19 Aug. 1981 35 p refs
(AD-A109306; DRSMI-RR-81-6) Avail: NTIS HC A03/MF A01 CSCL 04/1

Literature on atmospheric turbulence in the planetary boundary layer, with the main emphasis on the lowest tens of meters. A table summarizes 26 references which discuss variations in intensity of turbulence. This intensity tends to be greater over rough surfaces than over smooth surfaces. Intensity of turbulence normally decreases when either altitude or atmospheric stability increases. High wind speeds are more likely to be associated with nearly neutral stability than with very stable or very unstable conditions. This report also includes a discussion of the autocorrelation function for the three components of the wind vector.
Author (GRA)

N82-19739# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SEISMIC DISCRIMINATION Semiannual Technical Summary Report, 1 Oct. 1980 - 31 Mar. 1981
Michael A. Chinnery 31 Mar. 1981 105 p refs
(Contract F19628-80-C-0002; ARPA Order 512; AF Proj. 1A10)
(AD-A109184; ESD-TR-81-84) Avail: NTIS HC A06/MF A01 CSCL 08/11

This Semiannual Technical Summary describes the Lincoln Laboratory Vela Uniform program. Section 1 describes progress in the development of a prototype Seismic Data Center. This development is on schedule, and a first version of the prototype will be operational during the next six months. Section 2 describes a series of activities in the development and implementation of the seismic processing techniques that will be utilized in the prototype system. Section 3 describes a series of investigations in General Seismological Research. GRA

N82-19740# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.
ATLAS OF THE GLOBAL DISTRIBUTION OF THE TOTAL OZONE CONCENTRATION ACCORDING TO SATELLITE MEASUREMENTS [ATLAS DER GLOBALVERTEILUNG DES GESAMTOZONBETRAGES NACH SATELLITENMESSUNGEN (APRIL 1970-MAY 1972)]
Anver Ghazi 1980 47 p refs In GERMAN
(Mitt-28; ISSN-0069-5882) Avail: NTIS HC A03/MF A01

An atlas of interdisciplinair research on the many different aspects of ozone research is presented. Maps were drawn from backscatter ultraviolet satellite observations. Data are compiled on global distribution of the total ozone layer. E.A.K.

N82-19741# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Electron and Plasma Physics.

EVENT STUDY ON PRE-SUBSTORM PHASES AND THEIR RELATION TO THE ENERGY COUPLING BETWEEN SOLAR WIND AND MAGNETOSPHERE

R. J. Pellinen (Finnish Meteorological Inst.), W. Baumjohann (Muenster Univ., West Germany), W. J. Heikkila, V. A. Sergeev (Leningrad Univ.), A. G. Yahnin, G. Marklund, and A. O. Melnikov (Academy of Sciences, USSR) Nov. 1981 50 p refs Submitted for publication Co-sponsored by Deutsche Forschungsgeimschaft, and Finnish-Soviet Committee on Co-operation in Science and Technology

(Grant NSF ATM-78-3603)

(TRITA-EPP-81-04; ISSN-0348-7539) Avail: NTIS HC A03/MF A01

A sudden southward turning of the interplanetary magnetic field, immediately followed by a worldwide intensification of convection, is documented. Observations within the auroral zone and polar cap show enhanced activity ending in a localized substorm. Large fluctuations in ionospheric parameters starting before the substorm onset, and subsequent high energy particle precipitation (recorded by balloon X-ray detectors), with changes in maximum ionospheric current density and in electrojet halfwidth and total electrojet current, are resolved, together with the increase in auroral brightness prior to final breakup. Observations during this trigger phase are discussed. The energy coupling function correlates with the Joule heating rate at first, but subsequently increases as the heating rate decreases. This suggests that the start of the trigger phase is internally controlled while the length of the phase and onset of the final substorm are influenced by changes in the energy coupling function. Author (ESA)

N82-19742# Danish Meteorological Inst., Copenhagen. Div. of Geophysics.

DIFFUSE AND DISCRETE OPTICAL EMISSIONS AT THE POLEWARD BORDER OF THE MORNING AURORAL OVAL

K. Lassen, C. Danielsen, and V. Singh 1981 10 p refs Presented at 4th IAGA Scientific Assembly, Edinburgh Submitted for publication

(DMI-Geophis-Papers-R-66; ISBN 87-7478-201-0) Avail: NTIS HC A02/MF A01

A meridian scanning photometer was used to supplement all sky camera observations of high latitude morning auroras. A 5 to 10 deg wide area of diffuse light is recorded at the poleward edge of the morning to noon auroral oval. Discrete auroras known as high latitude morning auroras are embedded in the veil. Discrete as well as diffuse emissions are observed on practically every clear morning, both limited by a well defined border oriented along the geomagnetic meridian between 03 and 07 corrected geomagnetic time. The ratio I 6300A/I 5577A is greater in the diffuse background than in the discrete forms. The intensity of the diffuse emission has its maximum near 75 deg, coinciding with the oval. The intensity at this latitude generally increases 1 to 2 hr before the occurrence of the high latitude veil.

Author (ESA)

N82-19743# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

IONOSPHERIC IONS IN THE NEAR EARTH GEOMAGNETIC TAIL PLASMA LOBES

Stefano Orsini, Maurizio Candidi, Hans Balsiger (Bern Univ.), and Arturo Ghielmetti (Bern Univ.) May 1981 21 p refs Submitted for publication

(Grant SNSF-2.467.79)

(IPS-81-7) Avail: NTIS HC A02/MF A01

By comparing data from the plasma experiment on ISEE-2 and from the ion mass spectrometer on ISEE-1, composition and plasma properties of tailward flowing ions in the magnetotail lobes is assessed. The ions beams consist mainly of protons and singly charged oxygen, flowing roughly along magnetic field lines. It is concluded that these ions are of mainly ionospheric origin. They are observed with the same velocity due to the E x B filter action of the magnetotail. Estimates of the E sub Z electric field components in the lobes are given. Author (ESA)

N82-19744# Istituto di Ricerca e Tecnologia per lo Studio del Plasma Nello Spazio, Frascati (Italy).

KELVIN-HELMHOLTZ INSTABILITY OF THE MAGNETOPAUSE BOUNDARY: COMPARISON WITH OBSERVED FLUCTUATIONS

E. Trussoni (CNR, Turin), M. Dobrowolny, and G. Mastrantonio Sep. 1981 30 p refs

(IPS-81-12) Avail: NTIS HC A03/MF A01

Results for the wavelength of the most unstable perturbations and corresponding phase velocities are derived, using realistic profiles for the magnetopause transition, and using the parameter values deduced from the analysis of the Voyager 1 multiple magnetopause crossings. A numerical stability analysis was employed. The calculations are in reasonable agreement with the observations made by Lepping and Burlaga. This agreement considerably strengthens the idea that the fluctuations of the discontinuity surface shown by the observations are a result of a Kelvin-Helmholtz instability driven by velocity shear.

Author (ESA)

N82-19745# Stanford Univ., Calif. Dept. of Civil Engineering.

BAYESIAN GEOPHYSICAL MODEL FOR SEISMIC HAZARD

H. C. Shah and Martin W. McCann, Jr. May 1981 193 p refs

(Grant NSF ENV-77-17834)

(PB82-122391; NSF/CEE-81-36) Avail: NTIS HC A09/MF A01 CSCL 08K

The development of a methodology for modeling strong ground motion for application in seismic hazard analysis is presented. It is based on an event defined according to its size and seismotectonic properties. A Bayesian model is described that incorporates the information from empirical studies as well as theoretical seismological models into the estimate of future strong ground motion. The methodology defines what information is available and compares it to that currently being used. A theoretical seimological method is selected to provide additional input on strong ground motion into the Bayesian model. It is applied to the determination of the Fourier transform of acceleration and deterministic modeling of the Imperial Valley in southern California. A sensitivity study is presented which identifies the effects of various source parameters on the predicted strong motion. GRA

N82-19746# Iowa Univ., Oakdale.

STRATIGRAPHY, PETROGRAPHY AND DEPOSITIONAL HISTORY OF THE HERTHA FORMATION (UPPER PENNSYLVANIAN), MIDCONTINENT NORTH AMERICA Ph.D. Thesis

Robert Lee Ravn 1981 293 p

Avail: Univ. Microfilms Order No. 8128452

The Hertha Formation (Missourian Stage, Upper Pennsylvanian Series) of the Western Interior Basin is less regular lithologically and stratigraphically than are most overlying Pennsylvanian marine cyclothems. Three members were delineated, in ascending order: Critzer Limestone, Mound City Shale, Sniabar Limestone. Through application of a eustatic sea level fluctuation model for Hertha deposition, the Critzer Limestone was regarded as a transgressive unit, the Mount City Shale as deposited during maximum marine inundation, and the Sniabar Limestone as regressive. Extension of the transgressive-regressive depositional model to other portions of the Hertha outcrop revealed a significant miscorrelation between the Hertha and strata assigned to the underlying Pleasanton Group in extreme southern Kansas. Beds historically considered Hertha in this area consist only of the regressive Sniabar Member. Dissert. Abstr.

N82-19747# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Fluid Dynamics Panel.

MODELING THE LOWEST 1 Km OF THE ATMOSPHERE

W. S. Lewellen (Aeronautical Research Associates of Princeton, Inc.) Nov. 1981 89 p refs

(AGARD-AG-267; ISBN-92-835-1407-6) Avail: NTIS HC A05/MF A01

The interdependence between the turbulent transport of mass, momentum, and energy through the lower levels of the atmosphere, and the distribution of wind, temperature, and species within this layer were reviewed. Particular emphasis is placed on models, either analytical or numerical, which have a basic

theoretical foundation in turbulent transport modeling. The results of example model solutions are used to discuss such micrometeorological problems as: wind shear and turbulence around airports; the prediction of low-level clouds and fog; the dispersion of industrial pollutants; the interaction of electromagnetic radiation with turbulent fluctuations in humidity and temperature; and the evolution of organized features within the boundary layer. T.M.

N82-20072# Tel-Aviv Univ. (Israel). Dept. of Physics and Astronomy.
COLLECTIVE GRAVITATIONAL EFFECTS
Gerald E. Tauber *In* ESA Plasma Astrophys. Nov. 1981 p 365-368 refs (For primary document see N82-20030 10-88) Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20083# Academia Sinica, Peking (China). Inst. of Space Physics.
IDENTIFICATION OF THE DISCONTINUITIES AT THE MAGNETOPAUSE
Zhou Guo-cheng *In* ESA Plasma Astrophys. Nov. 1981 p 413-414 refs (For primary document see N82-20030 10-88) Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-19748 Texas A&M Univ., College Station.
A COMPUTATIONAL STUDY OF THE MODIFICATION OF RAINDROP SIZE DISTRIBUTIONS IN SUBCLOUD DOWNDRAFTS Ph.D. Thesis
Robert George Borchers 1981 156 p
Avail: Univ. Microfilms Order No. 8128876

A computational study is made of the variation of steady-state raindrop-size distributions (0.004 cm < or = radius < or = 0.40 cm) in adiabatic subcloud downdrafts of constant magnitude. The cloud base drop-size distribution is assumed to be Marshall-Palmer. The microphysical processes progressively introduced are evaporation, collision-coalescence, aerodynamic and collisional breakup of drops. Collision-coalescence and breakup are treated through a stochastic model. Thermodynamic and hydrometeoric variables of temperature, relative humidity, total liquid water, rainfall rate and radar reflectivity are computed as functions of height below cloud base along with the dropsize distributions. It is found that evaporation tends to deplete, as expected, the smaller members of the droplet population. Computed raindrop-size distributions agree quite well with measured maritime raindrop spectra. Dissert. Abstr.

N82-19749 British Library Lending Div., Boston Spa (England). Meteorological Office.
MAXIMUM WIND SPEEDS IN THE NORTH PACIFIC (WITH SPECIAL REFERENCE TO OWS P, N AND V)
L. V. Gorbach 3 Jun. 1981 27 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf.-Mirov. Tsent. Danny. T. Vyp. (Moscow), v. 64, 1980 p 38-53
(BLL-Trans-1495-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The different methods of computing maximum wind speeds (Vg) in the North Pacific are investigated. Comparison of computed and actual values of Vg indicates that in temperature latitudes all of the methods may be used. In tropical regions Vg must be computed from annual maximum wind speeds. An analysis is presented of maximum wind speeds at the locations of weather stations. B.W.

N82-19750 British Library Lending Div., Boston Spa (England). Meteorological Office.
AREA PRECIPITATION MEASUREMENT BY WEATHER RADAR: PROBLEMS AND PRACTICAL EXPERIENCES
R. Aniol and J. Riedl 29 Oct. 1981 26 p refs Transl. into ENGLISH from Met. Rundsch. (Berlin), v. 32, 1979 p 116-127
(BLL-Trans-1458-(9022.552)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The data collection process and factors determining the accuracy of a radar system are described. Experience with different problems in the calculation of areal precipitation intensity is discussed with the aid of examples, namely correction using surface rain gauge readings, the effect of the Z/R ratio, the height of the freezing level, attenuation losses, sampling rate and screening in hilly terrain. Examples of problems still to be solved are the elimination of ground clutter, the detection of hail, the intersection of the melting layer and instances of snowfall or mixed precipitation. Author

N82-19751 British Library Lending Div., Boston Spa (England).
THE COMPUTATION OF THE GROUND SURFACE TEMPERATURE FOR SIMULATION OF THE GENERAL ATMOSPHERIC CIRCULATION
I. Jacobsen, H. Reiser, and E. Heise 29 Oct. 1981 37 p Transl. into ENGLISH from Abt. Forsch., Interner Ber., West Germany, 1980 30 p
(BLL-Trans-1521-(9022.552)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

Simple equations for forecasting surface temperature in circulation models are compared with simple wave solutions of the one-dimensional thermal conductivity equation, given a pre-set external drive function (residue of the energy fluxes through a surface element). N.W.

N82-19752 British Library Lending Div., Boston Spa (England).
REGIONAL CLASSIFICATION OF THE SPECTRAL VARIANCE OF LONG EUROPEAN TEMPERATURE SERIES AND ITS APPLICATION IN A STATISTICAL FILTER MODEL FOR FORECASTING IN THE REGION NORTH OF THE ALPS
C. D. Schoenwiese 24 Jun. 1981 22 p refs Transl. into ENGLISH from Met. Rundsch. (Berlin), vol. 33, 1980 p p 167-174
(BLL-Trans-1514-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

A total of 35 long European temperature series were analysed with reference to spectral variance T > 1a (where T = period and a = year) and classified in the range 1a < T < 10a. It is demonstrated that variance components of particular periods dominate and that individual geographical regions of Europe have typical variance spectra. Using 6 series for the region north of the Alps whose annual means are closely correlated, a statistical model is developed based on a Gaussian lowpass filter, 66 cosine band-pass filters, and the results of spectral variance analysis. This model approximates the regional annual temperature means with a Pearson correlation coefficient of r = +0.95. The corresponding extrapolation for the next few years indicates moderately increasing temperatures up to about 1981, followed by moderately decreasing temperatures. Author

N82-19753 British Library Lending Div., Boston Spa (England).
INSTRUMENTS AND METHODS FOR STUDYING ATMOSPHERIC ELECTRICITY
I. M. Imyanitov 19 Nov. 1980 39 p refs Transl. into ENGLISH from Gos. Izd. Tekh. Teor. Lit. (Moscow), 1957 p 7-49
(BLL-Trans-1487-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

A review of mechanical electrometers was made. The estimable properties such as simplicity of design, good insulation, and relative cheapness as well as the shortcomings which impair their use were considered. The reliability and stability of the following instruments, designed to measure atmospheric electricity, are discussed: mechanical electrometers, Wulf two-string electrometer, Sg-2M and 1M electrometers, leaf and torsion quartz electrometers, Braun electrometer, electrometers with and without an auxiliary field, Perucca and vibration electrometers, and other related instrumentation. M.D.K.

N82-19754 British Library Lending Div., Boston Spa (England).
STATISTICAL STUDY OF FREEZING CLOUDS IN THE GINA 2-PAP, MARCH - APRIL 1979
J. F. Gayet 24 Jun. 1981 46 p refs Transl. into ENGLISH of Rept. Sci. 27 Clermont-Ferrand Univ., France, 1980 15 p
(BLL-Trans-1511-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The progress of the GINA II-PAP measurement program carried out in Spain and an account of employed methods is reported. The microphysical characteristics of cumuliform and stratiform clouds at negative temperatures, and the meteorological conditions are described. The process of formation of precipitation process in which the ice phase played an important role is examined. It is hypotesized that particles with a mean size greater than 200 micro m are composed of ice. It is concluded that the large concentrations of this type of particle is due to ice multiplication processes. E.A.K.

N82-19755 British Library Lending Div., Boston Spa (England).
THE APPLICABILITY OF PRESSURE MEASUREMENTS BY RADIOSONDES TO CALCULATING THE HEIGHT
G. Adrian and N. Witte 30 Apr. 1981 24 p refs Transl. into ENGLISH from Met. Rundsch., (Berlin), no. 33, 1980 p 107-116
(BLL-Trans-1505-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Application of pressure measurements by radiosondes to calculate the height of the measured profiles of temperature and humidity in the lower troposphere is considered. Measurements made by radar or theodolite are compared. Considerable deviations are shown between the heights calculated barometrically and those resulting from radar or theodolite data, especially for sondes of the older type, as well as in decoding the pressure records. Deviations found by comparisons in a qualitative as well as a quantitative manner are interpreted. It is concluded that in the analysis of pressure records of the newer radiosonde the height can be computed barometrically with an accuracy of better than 2%. E.A.K.

N82-19756 British Library Lending Div., Boston Spa (England).
CLASSIFICATION OF THE FIELDS OF ANOMALY IN MONTHLY WATER TEMPERATURE OF THE NORTH ATLANTIC DURING THE COLD HALF-YEAR
R. M. Vilfand 27 Jul. 1981 6 p refs Transl. into ENGLISH from Gidromet. Nauch.-Issled. Tsentr. SSSR (USSR), v. 231, 1980 p 123-126
(BLL-Trans-1509-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The use of the thermal characteristics of ocean surface in making long-term forecasts is examined. Fields of anomaly in the mean monthly water temperature of the North Atlantic were classified and analyzed. R.J.F.

N82-19757 British Library Lending Div., Boston Spa (England).
METHODOLOGY FOR THE USE OF (FOREIGN) SYNOPTIC MESSAGES IN THE GENERALIZATION OF CLIMATOLOGICAL INFORMATION (DERIVATION OF CLIMATIC PARAMETERS)
Z. M. Makhover, L. A. Nudelman, and A. P. Penkov 3 Jun. 1981 18 p refs Transl. into ENGLISH from Vses. Nauch-Issled. Inst. Gidromet. Inf. Mirov. Tsent. Danny. (USSR), v. 65, 1979 p 31-45
(BLL-Trans-1506-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The fundamentals of the methodology applied to processing synoptic data on cloud cover, visibility, and other weather phenomena are considered. Emphasis is placed on the processing of cloud cover from observations made at Soviet meteorological stations. The frequency of total and low cloud cover, the frequency of cloud forms the height of the lower cloud boundary are determined along with the frequency of fog, mist, haze, dust or sand storms, snow-storms, thunderstorms, hail, and glazed frost. Data observations for each of four synoptic hours, for each month, and for the entire year are included. Data are presented in tabular form. J.M.S.

N82-19758 British Library Lending Div., Boston Spa (England).
A NEW METEOROLOGICAL CODE FOR 1 JANUARY 1982
M. Merlet 30 Apr. 1981 9 p Transl. into ENGLISH from Met-Mar (France), no. 109, 1980 p 43-46
(BLL-Trans-1510-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The implemention of the SYNOP/SHIP meteorological code is discussed. The coding system is adapted for land (SYNOP) and marine (SHIP) stations. The adaptation of the code to automatic encoding and to simple computerized programming is outlined. Requirements for the new code are: (1) simplicity; (2) adaptable structure; (3) have a key group indicating content of message; (4) contain indicators; (5) avoid coding dodges; (6) present measured first, followed by visually observed data; (7) account for data requirements which are related to exchange in the global network, and at regional and local levels. E.A.K.

N82-19759 British Library Lending Div., Boston Spa (England).
THE CONTROL OF THE QUALITY OF SURFACE METEOROLOGICAL INFORMATION
M. Z. Shaymardanov et al 18 Mar. 1981 33 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf. Mirov. Tsent. Danny. (USSR), v. 67, 1980 p 30-45
(BLL-Trans-1503-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Results of algorithms to control surface meteorological information applied in the system for processing meteorological data were analyzed. The various criteria did not operate effectively. The shortcomings which appeared and the failure to control a range of elements made it necessary to refine and supplement the algorithms and to devise new ones. It was necessary above all to exclude the control criteria based on the Lagrange interpolation formulas, because a polynomial of one and the same degree was used in all instances. N.W.

N82-19760 British Library Lending Div., Boston Spa (England).
COST ESTIMATES IN CONNECTION WITH THE SELECTION OF A SYSTEM FOR LONG-TERM STORAGE OF HYDROMETEOROLOGICAL DATA
L. F. Penkova and N. N. Bydanov 12 Mar. 1981 24 p refs Transl. into ENGLISH from Vses. Nauch.-Issled. Inst. Gidromet. Inf. Mirov. Danny. (USSR), v. 67, 1980 p 101-110
(BLL-Trans-1502-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Estimates of the specific costs of methods of archiving, handling, and long-term storage of hydrometeorological data are discussed. A comparison of systems in terms of cost characteristics with a storage system based on magnetic tape was made. Conclusions concerning the efficiency of the application of particular systems are presented and discussed. It is concluded, in the general case, that economically expedient systems for long-term storage of data sets must be constructed using both magnetic tape and photographic film as archive carriers. M.D.K.

N82-19761 British Library Lending Div., Boston Spa (England).
SOME CHARACTERISTICS OF THE VARIATION OF AIR TEMPERATURE IN THE NORTHERN HEMISPHERE DURING INDIVIDUAL MONTHS OF THE PERIOD 1881-1975
L. P. Spirina 3 Jun. 1981 15 p refs Transl. into ENGLISH from Glav. Geof. Obs. (USSR), v. 438, 1980 p 117-125
(BLL-Trans-1497-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The variation of air temperature in the Northern Hemisphere during individual months of the years 1881 to 1975 is examined. It is found that there was a warming trend in recent years. However, the absence of sub-annual synchronicity in the temperature variation, and the large variability over the last 10 to 15 years, do not provide a basis for asserting that the observed mean annual tendency towards warming will be maintained in the future. R.J.F.

N82-19762 British Library Lending Div., Boston Spa (England). Meteorological Office.
TURBULENCE WITHIN CUMULUS CLOUDS AND OUTSIDE THEM
V. I. Silayeva and S. M. Shmeter 30 Apr. 1981 12 p refs Transl. into ENGLISH from Tsent. Aerol. Obs. T. Vyp. (Moscow), v. 128, 1977 p 63-72
(BLL-Trans-1481-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Within a cumulus cloud and in its environment the standard deviations of the speed of horizontal and vertical gusts are several times greater than the values of the gusts in the undisturbed portion of the atmosphere. The mean curve of the distribution of the horizontal and vertical gusts is described by a normal distribution. In individual cases the distributions of the horizontal and vertical gusts differ substantially from the normal. Within

the Cu the values of vertical gusts increase with the thickness of the cloud. The degree of gustiness (vertical gusts and the mean vertical speed) by contrast, is on average inversely proportional to the cloud. Powerful convective currents are often pseudolaminar, while small currents are also very turbulent. S.L.

N82-19763 British Library Lending Div., Boston Spa (England).
THE USE OF WEATHER RADAR IN THE CIVIL AVIATION WEATHER SERVICE
K. J. Tenter 11 Feb. 1981 12 p ref Transl. into ENGLISH from Oesterreich. Gesellsch. Met., Wetter u. Leben (Vienna), vol. 30, 1978 p 224-229
(BLL-Trans-1456-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

Thunderstorms associated with hail and turbulence continue to constitute a hazard to aviation. The use of weather radar is intended to enhance the provision to pilots of information and warnings about areas of bad weather. The experience gained in employing a hail reconnaissance pilot has formed the basis for a weather radar service. S.L.

N82-19764 British Library Lending Div., Boston Spa (England). Meteorological Office.
INVERSION LAYERS AND THEIR INTERACTION WITH CUMULUS CLOUDS BELOW
S. M. Rozhanets, A. I. Furman, and S. M. Shmeter 30 Apr. 1981 10 p refs Transl. into ENGLISH from Tsent. Aerol. Obs., T. Vyp. (Moscow), v. 128, 1977 p 73-79
(BLL-Trans-1482-(9022.549)) Avail: British Library Lending Div., Boston Spa, Engl.

Inversion and isothermal layers, which influence the development of cumulus clouds are discussed. Capping layers form frequently in the free atmosphere, and inversions are observed in all seasons and weather. The development of cumulus clouds is affected by: the height of the lower boundary of the retaining layer, thickness, temperature gradient, and humidity within above and below the layer. Data are presented for frequency, height of lower boundary and thickness for inversions in the troposphere during the summer. It is suggested that during Cu development stratification above the clouds undergoes marked variations. E.A.K.

N82-19765 British Library Lending Div., Boston Spa (England). Meteorological Office.
AUTOMATIC MEASUREMENT OF AREAL PRECIPITATION USING C-BAND RADAR
W. Attmannspacher [1982] 7 p refs Transl. into ENGLISH from Offenbach a. M., D. Wetterd., Ann. Met. (Neue Folge), no. 13, 1977 p 167-169
(BLL-Trans-1378-(9022.552)) Avail: British Library Lending Div., Boston Spa, Engl.

The radar equipment, the digitalizing system of the video signal and the calculation of the measured data by aid of a connected electronic computer is described. Examples of the measurements are compared to a special rain guage network. These comparisons and some statistical treatments represent the quality of the radar measurements. Area precipitation means over a two month period are measured in a realistic way only by aid of the radar. S.L.

N82-19766 British Library Lending Div., Boston Spa (England). Meteorological Office.
THE PROBLEM OF PRECIPITATION MEASUREMENT BY ATTENUATION OF RADIO WAVES
M. D. Belaga 30 Apr. 1981 14 p refs Transl. into ENGLISH from Tsent. Aerol. Obs. T. Vyp. (Moscow), v. 135, 1979 p 64-69
(BLL-Trans-1475-(9022.549)) Avail: British Library Lending Div., Boston Spa, Engl.

A radar system which measures precipitation over small areas or paths and performs pluviometric measurements is presented. The radar unit is used to measure precipitation in mountain valleys, and to calibrate radar systems used in measuring precipitation over large areas. Phase modulating reflectors may be used to measure the intensity and amount of precipitation for attenuation in the centimetre band. The marked reduction in the variability of the coefficients in the equation and the increase in accuracy links the intensity of precipitation to produced attenuation. The obtained information may be applied to measuring small areas and in calibrating existing radar systems for the measurement of precipitative intensity of reflectivity over wide areas. E.A.K.

N82-19767 Institut d'Aeronomie Spatiale de Belgique, Brussels.
A FREE BOUNDARY VALUE PROBLEM ARISING IN CLIMATE DYNAMICS
C. Nicolis 1981 36 p refs Submitted for publication Sponsored in part by Inst. Internationaux de Physique et de Chimie
(Aeronomica-Acta-A-240-1981) Avail: Issuing Activity

A heat and mass transfer problem which involves coexisting phases was studied. The atmosphere hydrosphere cryosphere is the dynamical system wherein the spatial degrees of freedom along the vertical and longitudinal directions are lumped. The reduced one dimensional system is modelled by a yearly averaged, energy balance model, considering the coupling between the two phases present: the ice sheets and the ocean. A Stefan type of boundary condition is introduced at the interface. The balance equation is linearized and solved by mode truncation and Galerkin's method. The stability of the present day climatic regime with respect to small excursions of the ice boundary is analyzed. The thermodynamic aspects and the characteristic time scales of evolution are emphasized. Author (ESA)

N82-19768*# Wisconsin Univ. - Madison. Dept. of Meteorology.
OPTIMUM EMPLOYMENT OF SATELLITE INDIRECT SOUNDINGS AS NUMERICAL MODEL INPUT Final Report
Lyle H. Horn, John C. Derber, Thomas L. Koehler, and Brian D. Schmidt Dec. 1981 112 p refs
(Grant NsG-5252)
(NASA-CR-168509) Avail: NTIS HC A06/MF A01 CSCL 04B

The characteristics of satellite-derived temperature soundings that would significantly affect their use as input for numerical weather prediction models were examined. Independent evaluations of satellite soundings were emphasized to better define error characteristics. Results of a Nimbus-6 sounding study reveal an underestimation of the strength of synoptic scale troughs and ridges, and associated gradients in isobaric height and temperature fields. The most significant errors occurred near the Earth's surface and the tropopause. Soundings from the TIROS-N and NOAA-6 satellites were also evaluated. Results again showed an underestimation of upper level trough amplitudes leading to weaker thermal gradient depictions in satellite-only fields. These errors show a definite correlation to the synoptic flow patterns. In a satellite-only analysis used to initialize a numerical model forecast, it was found that these synoptically correlated errors were retained in the forecast sequence. For individual titles, see N82-19769 through N82-19771.

N82-19769*# Wisconsin Univ. - Madison. Dept. of Meteorology.
A CASE STUDY OF HEIGHT AND TEMPERATURE ANALYSES DERIVED FROM NIMBUS-6 SATELLITE SOUNDINGS
Thomas L. Koehler *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 1-50 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

Height and temperature analyses were constructed on a subset of the LFM grid using only Nimbus-6 satellite temperature profiles from approximately 1800 GMT 22 Feb. 1976. Several experiments were performed to evaluate various features of these satellite derived analyses. Fields derived from the bracketing LFM analyses provide the verification data. The results indicate that Nimbus-6 soundings were able to correctly position the major troughs and ridges, but underestimate gradients in the analyses due primarily to the soundings being too warm in the troughs. No advantage could be found in using a set of satellite soundings with a greater horizontal resolution than the DST soundings. M.D.K.

N82-19770*# Wisconsin Univ. - Madison. Dept. of Meteorology.
EVALUATION OF TIROS-N AND NOAA-6 SATELLITE DATA: COMPARISONS OF COLOCATED SOUNDINGS AND ANALYSES FOR A JANUARY CASE

Brian D. Schmidt, Thomas L. Koehler, and Lyle H. Horn *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 51-81 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

An early January 1980 synoptic situation was used in evaluating the performance of TIROS-N and NOAA-6 operational temperature soundings. Visual and statistical comparisons of temperature and thickness fields were employed to determine the effects of manual screening of the satellite soundings and measure the accuracy of both the satellite soundings and analyses derived from them. Comparisons between the performance of TIROS-N and NOAA-6 were emphasized. Both satellites were able to correctly position the major troughs and ridges. Gradients were underestimated though, with troughs markedly too warm and ridges slightly too cold. The poorest data occurred near the surface and tropopause as reflected by larger standard deviations in those layers. The performance of TIROS-N was slightly superior to that of NOAA-6. M.D.K.

N82-19771*# Wisconsin Univ. - Madison. Dept. of Meteorology.
A NUMERICAL EVALUATION OF TIROS-N AND NOAA-6 ANALYSES IN A HIGH RESOLUTION LIMITED AREA MODEL
John C. Derber, Thomas L. Koehler, and Lyle H. Horn *In its* Optimum Employment of Satellite Indirect Soundings as Numerical Model Input Dec. 1981 p 82-108 refs (For primary document see N82-19768 10-47)
Avail: NTIS HC A06/MF A01 CSCL 04B

Vertical temperature profiles derived from TIROS-N and NOAA-6 radiance measurements were used to create separate analyses for the period 0000 GMT 6 January to 0000 GMT 7 January 1980. The 0000 GMT 6 January satellite analyses and a conventional analysis were used to initialize and run the University of Wisconsin's version of the Australian Region Primitive Equations model. Forecasts based on conventional analyses were used to evaluate the forecasts based only on satellite upper air data. The forecasts based only on TIROS-N or NOAA-6 data did reasonably well in locating the main trough and ridge positions. The satellite initial analyses and forecasts revealed errors correlated to the synoptic situation. The trough in both TIROS-N and NOAA-6 forecasts which was initially too warm remained too warm as it propagated eastward during the forecast period. Thus, it is unlikely that the operational satellite data will improve forecasts in a data dense region. However, in regions of poor data coverage, the satellite data should have a beneficial effect on numerical forecasts. M.D.K.

N82-19772# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FORECASTS OF PRECIPITATION IN THE NORTHEAST OF BRAZIL: DYNAMIC ASPECTS [PREVISAO DE PRECIPITACAO NO WORDESTE DO BRASIL: O ASPECTO DINAMICO]
Vernon Edgar Kousky and Antonio Divino Moura Oct. 1981 17 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Brazilian Symp. on Hydrol. and Hydrol. Resources, 15-19 Nov. 1981
(INPE-2244-PRE/029) Avail: NTIS HC A02/MF A01

Large scale atmospheric oceanic circulation changes in the North and South Atlantic are dynamically related to rainfall variability in Northeast Brazil. Above normal cyclonic activity near Newfoundland is associated with stronger than normal westerlies in the North Atlantic, a stronger than normal North Atlantic subtropical high and stronger than normal northeast trade winds at low latitudes. These features accompany a more southward than normal displacement of the intertropical convergence zone and wetter than normal conditions in Northeast Brazil. Drier than normal conditions occur when the opposite situation exists. The severest droughts occur in association with the simultaneous weakening of the North Atlantic high and strengthening of the South Atlantic high. These events are also found to occur in association with the simultaneous occurence of positive sea surface temperature anomalies in the north, and negative SST anomalies in the south Tropical Atlantic. Author

N82-19773# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY ON THE DEVELOPMENT OF INTERMEDIATE SCALE DISTURBANCES WITH A MODEL OF PRIMITIVE EQUATIONS OF HIGH VERTICAL RESOLUTION Ph.D. Thesis
Prakki Satyamurty Sep. 1981 88 p refs In PORTUGUESE; ENGLISH summary
(INPE-2232-TDL/063) Avail: NTIS HC A05/MF A01

Linear stability of basic states in the vicinity of idealized weak thermal fronts was examined. Vertical profiles of the basic zonal wind and potential temperature are hyperbolic tangent. Even if the curvature in the lower levels is positive, intermediate scale unstable modes appear in smaller static stability and shear or vertical distribution of diabatic heating due to the liberation of latent heat in the lower troposphere. If the diabatic heating is not allowed for and the curvature is unfavorable inclusion of surface drag produces an additional growth rate peak in the intermediate scales. The amplitude of the most unstable intermediate scale wave is confined to the lower troposphere and its growth rate increases with the inclusion of diabatic heating. E.A.K.

N82-19774*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VISSR ATMOSPHERIC SOUNDER (VAS) SIMULATION EXPERIMENT FOR A SEVERE STORM ENVIRONMENT
Dennis Chesters, Louis W. Uccellini, and Anthony Mostek Sep. 1981 50 p refs Submitted for publication
(NASA-TM-83822) Avail: NTIS HC A03/MF A01 CSCL 04B

Radiance fields were simulated for prethunderstorm environments in Oklahoma to demonstrate three points: (1) significant moisture gradients can be seen directly in images of the VISSIR Atmospheric Sounder (VAS) channels; (2) temperature and moisture profiles can be retrieved from VAS radiances with sufficient accuracy to be useful for mesoscale analysis of a severe storm environment; and (3) the quality of VAS mesoscale soundings improves with conditioning by local weather statistics. The results represent the optimum retrievability of mesoscale information from VAS radiance without the use of ancillary data. The simulations suggest that VAS data will yield the best soundings when a human being classifies the scene, picks relatively clear areas for retrieval, and applies a 'local' statistical data base to resolve the ambiguities of satellite observations in favor of the most probable atmospheric structure. A.R.H.

N82-19775*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PREDICTABILITY OF THE TROPICAL ATMOSPHERE
J. Shukla Oct. 1981 57 p refs
(NASA-TM-83829) Avail: NTIS HC A04/MF A01 CSCL 04B

An examination of the deterministic predictability for tropics and middle-latitudes separately indicates that the theoretical upper limit of deterministic predictability for low latitudes is shorter than that for middle latitudes. Variability of time averages in low latitudes is mainly determined by the location and intensity of the large-scale Hadley and Walker circulations. Since these are largely influenced by the slowly varying boundary conditions of sea surface temperature and soil moisture, and since synoptic instabilities are not strong enough to change drastically the large scale flow, there is larger potential for predictability of monthly and seasonal means in low latitudes. It is conjectured that for short and medium range deterministic prediction, a prescribed diabatic heating field due to moist convection may be more useful than their explicit calculation from the evolving flow. R.J.F.

N82-19776# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A NUMERICAL MODEL FOR SIMULATION OF LOCAL CIRCULATION, APPLIED TO THE COASTAL REGION OF NORTHEASTERN BRAZIL [UN MODELO NUMERICO PARA SIMULACAO DAS CIRCULA COES LACAIS, APLICADO A REGIAO COSTEIRA DO NORDESTE DO BRASIL]
Sergio Henrique Franchito and Vernon Edgar Kousky Nov. 1981 69 p refs In PORTUGUESE; ENGLISH summary Submitted

for publication
(INPE-2270/PRE/051) Avail: NTIS HC A04/MF A01

A predictive, two-dimensional, nonlinear, primitive equation model was employed to study the land-sea breeze circulation in North-Northeast Brazil. The model considers dry air and involves boundary layer formulation. The surface temperature is determined by a forcing function applied to the Earth's surface. The time integration scheme utilized is that of Shuman-Brown-Campana. In order to study the seasonal variations of the circulation, under conditions of zero mean flow and flat terrain, the model is applied to several months, using different values of land and sea surface temperatures, corresponding to the time at the year. With the inclusion of elevated terrain, the circulation becomes more intense during both day and night. Under the influence of mean onshore flow (5 m/s) and considering flat terrain, the sea breeze becomes slightly weaker. In order to verify the influence of the atmospheric stability on the circulation, the model is initialized using different vertical temperature profiles. R.J.F.

N82-19777# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDIES OF THE ENERGY AND THE FLUX OF WATER VAPOR IN THE ATMOSPHERE OVER NORTHEASTERN BRAZIL Ph.D. Thesis - 30 Jun. 1981 [ESTUDOS DA ENERGETICA E DO FLUXO DE VAPOR D'AGUA NA ATMOSFERA SOBRE O NORDESTE BRASILEIRO]
Valdo daSilva Marques Dec. 1981 174 p refs In PORTUGUESE; ENGLISH summary
(INPE-2288-TDL/068) Avail: NTIS HC A08/MF A01

The energetics and water vapor balance over Northeast Brazil are studied with the purpose of identifying interannual and seasonal variations. All the quantities are calculated for a cylinder, containing most of Northeast Brazil. Monthly mean data for a period of 8 years are used. Calculations are made separately for the dry season (September-October-November), wet season (March-April-May), wet season of 1976 (relatively dry) and 1974 (relatively wet). Evaluation of the mass budget revealed the following patterns: during the wet year/season, there is convergence in the lower troposphere and divergence in the upper troposphere causing rising motion in the lower atmosphere, thus favoring precipitation. On the other hand, during the dry year/season convergence is found in the middle troposphere with divergence above and below, inducing sinking motion in the lower levels. Such a situation provokes drought. Interannual and seasonal variations of water vapor flux are found to occur mainly in the North/Northwest and South/Southeast borders of the cylinder. S.L.

N82-19778# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONVERGENCE ZONES IN THE SOUTH ATLANTIC AND THEIR INFLUENCE ON THE PRECIPITATION REGIME IN NORTHEASTERN BRAZIL M.S. Thesis [ZONAS DE CONVERGENCIA NO ATLANTICO SUL E SUAS INFLUENCIAS NO REGIME DE PRECIPITACAO NO NORDESTE DO BRASIL]
Lucimar Luciano deOliveira Jan. 1982 125 p refs In PORTUGUESE; ENGLISH summary
(INPE-2307-TDL/074) Avail: NTIS HC A06/MF A01

The relationship between the convergence zones in the South Atlantic and the rainfall variability on Northeast Brazil was studied. Radiosonde data from the Posto Oceanografico da Ilha da Trindade, wind charts from the National Meteorological Center, USA, precipitation data of selected coastal stations and satellite imagery were utilized. Monthly and half-yearly brightness charts were constructed from such satellite imagery between the parallels of 10 degrees N and 55 degrees S and the meridians of 010 degrees E and 080 degrees W, for a dry and a rainy year. The results reveal that dry years correspond to the permanence of the Spring pattern of interaction between the intertropical convergence zone and the South Atlantic convergence zones, the Bolivian high (in 200 mb) being more developed; in such dry years a stronger and more regular Walker circulation seems to be present. R.J.F.

N82-19779*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROWAVE RADIOMETRIC OBSERVATIONS NEAR 19.35, 92 AND 183 GHz OF PRECIPITATION IN TROPICAL STORM CORA
T. T. Wilheit, A. T. Chang, J. L. King, E. B. Rodgers, R. A. Nieman, B. M. Krupp, A. S. Milman, J. S. Stratigos, and H. Siddalingaih [1982] 28 p refs Prepared in cooperation with Computer Sciences Corp., Silver Spring, Md. and Systems and Applied Sciences Corp., Riverdale, Md. and GIT and OAO Corp., Beltsville, Md. Submitted for publication
(NASA-TM-82164) Avail: NTIS HC A03/MF A01 CSCL 04B

Observations of rain cells in the remains of a decaying tropical storm were made by Airborne Microwave Radiometers at 19.35,92 and three frequencies near 183 GHz. Extremely low brightness temperatures, as low as 140 K were noted in the 92 and 183 GHz observations. These can be accounted for by the ice often associated with raindrop formation. Further, 183 GHz observations can be interpreted in terms of the height of the ice. The brightness temperatures observed suggest the presence of precipitation sized ice as high as 9 km or more.
M.D.K.

N82-19780*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MONITORING TROPICAL CYCLONE INTENSITY USING WIND FIELDS DERIVED FROM SHORT-INTERVAL SATELLITE IMAGES
Edward B. Rodgers and R. Cecil Gentry Jul. 1981 51 p refs
(NASA-TM-82162) Avail: NTIS HC A04/MF A01 CSCL 04B

Rapid scan visible images from the Visible Infrared Spin Scan Radiometer sensor on board SMS-2 and GOES-1 were used to derive high resolution upper and lower tropospheric environmental wind fields around three western Atlantic tropical cyclones (1975-78). These wind fields were used to derive upper and lower tropospheric areal mean relative vorticity and their differences, the net relative angular momentum balance and upper tropospheric mass outflow. These kinematic parameters were shown by studies using composite rawinsonde data to be strongly related to tropical cyclone formation and intensity changes. Also, the role of forced synoptic scale subsidence in tropical cyclone formation was examined. The studies showed that satellite-derived lower and upper tropospheric wind fields can be used to monitor and possibly predict tropical cyclone formation and intensity changes. These kinematic analyses showed that future changes in tropical cyclone intensity are mainly related to the 'spin-up' of the storms by the net horizontal transport of relative angular momentum caused by convergence of cyclonic vorticity in the lower troposphere and to a lesser extent the divergence of anticyclone vorticity in the upper troposphere.
Author

N82-19781*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ESTIMATING OCEAN-AIR HEAT FLUXES DURING COLD AIR OUTBREAKS BY SATELLITE
Shu-Hsien Chou and David Atlas Nov. 1981 52 p refs Submitted for publication Original contains color illustrations
(NASA-TM-83854) Avail: NTIS HC A04/MF A01 CSCL 04B

Nomograms of mean column heating due to surface sensible and latent heat fluxes were developed. Mean sensible heating of the cloud free region is related to the cloud free path (CFP, the distance from the shore to the first cloud formation) and the difference between land air and sea surface temperatures, theta sub 1 and theta sub 0, respectively. Mean latent heating is related to the CFP and the difference between land air and sea surface humidities q sub 1 and q sub 0 respectively. Results are also applicable to any path within the cloud free region. Corresponding heat fluxes may be obtained by multiplying the mean heating by the mean wind speed in the boundary layer. The sensible heating estimated by the present method is found to be in good agreement with that computed from the bulk transfer formula. The sensitivity of the solutions to the variations in the initial coastal soundings and large scale subsidence is also investigated. The results are not sensitive to divergence but are affected by the initial lapse rate of potential temperature; the greater the stability, the smaller the heating, other things being equal. Unless one knows the lapse rate at the shore, this

requires another independent measurement. For this purpose the downwind slope of the square of the boundary layer height is used, the mean value of which is also directly proportional to the mean sensible heating. The height of the boundary layer should be measurable by future spaceborn lidar systems. B.W.

N82-19782# Cornell Univ., Ithaca, N. Y. School of Electrical Engineering.
REPORT ON THE ANALYSIS OF DATA FROM THE NOAA/ALASKAN MST RADAR SYSTEM Interim Report
M. F. Larsen, M. C. Kelly, and D. T. Farley Nov. 1981 42 p refs
(Grant AF-AFOSR-0020-80; AF Proj. 2310)
(AD-A109056; AFOSR-81-0859TR) Avail: NTIS HC A03/MF A01 CSCL 04/2

During this period the investigation of mesoscale eddy spectra was completed as well as a study of objective analysis schemes using geostrophic wind adjustments. Both depend upon the continuous data of the NOAA MST radar at Poker Flat, Alaska. The atmospheric power spectral studies revealed a k to the minus 5/3 inertial subrange at time scales of hours. The implication in this essentially two dimensional eddy regime is a source of energy existing at spatial scales of less than 100 km, propagating energy up the spectrum toward lower wavenumbers. At smaller scales, in the fully 3-d turbulent spectrum, the classic Kolmogorov inertial spectrum is found with energy cascading towards smaller scales. Again, a source of energy is suggested on the scale of 10-100 km. The candidate is convection. In the study of objective analysis techniques, Cressman, and Gandin and other approaches are analyzed using the continuous radar data record. No significant differences were found between the Cressman and Gandin schemes. Knowing the character of the radar data with respect to these well-known analyses now permits comparison to more sophisticated and less trivial techniques and may lead to suggestions for entirely new concepts.
Author (GRA)

N82-19783# Battelle Columbus Labs., Ohio.
NUMERICAL DECONVOLUTION TO OBTAIN CLOUD SIGNATURES FROM SCATTERED LIGHT PULSES
James M. Supplee and Dennis W. McGuire Adelphi, Md. Harry Diamond Labs. Jul. 1981 44 p refs
(Contract DAAG29-76-D-0100)
(AD-A108806; HDL-CR-81-100-1) Avail: NTIS HC A03/MF A01 CSCL 20/6

The optical return pulse resulting from light reflected from a cloud is given by a convolution of the transmitted pulse with the system range response and the cloud signature. To calculate the cloud signature when everything else is known requires a deconvolution. Since this deconvolution enhances noise, it is very difficult to get better resolution in the cloud signature than the 1 to 2 m that is immediately available by dividing the return pulse by the range response. (This relatively good resolution is available in this way because the transmitted pulse is fairly short, being about 6 ns FWHM.) It is shown that modestly improved resolution is possible if the signal to noise ratio in the return pulse is greater than about 100 to 1. Author (GRA)

N82-19784# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Geophysical Sciences Branch.
SYNOPTIC METEOROLOGY DURING THE SNOW-ONE FIELD EXPERIMENT
Michael A. Bilello Nov. 1981 60 p refs
(DA Proj. 4A7-62730-AT-42)
(AD-A109080; CRREL-SR-81-27) Avail: NTIS HC A04/MF A01 CSCL 04/2

The daily atmospheric pressure systems and weather fronts that traversed the northeastern United States during the SNOW-ONE Field Experiment from 11 January through 20 February 1981 are summarized. This experiment is the first in a planned series of measurements to study the influence of atmospheric obscurants on electro-optical system performance. The analysis of the large-scale synoptic patterns that developed during the field test period constitutes a critical component of the research program. The weather during the measurement period included nine new daily high temperature records. January was one of the driest and February was one of the wettest ever observed. These conditions were caused in part by two high pressure cells and two major low pressure systems that crossed the region. One of these lows brought warm air and heavy rain to New England, and the other produced significant snowfall in northern Vermont. GRA

N82-19785# Aeronautical Research Labs., Melbourne (Australia).
AIRCRAFT MEASUREMENTS OF THE FREQUENCY OF TURBULENCE ENCOUNTERS IN AUSTRALIA. A REVIEW AND ASSESSMENT
Douglas J. Sherman Mar. 1981 35 p refs
(AD-A108923; ARL/Struc-Note-471) Copyright. Avail: Issuing Activity CSCL 01/1

All available aircraft V-g-h measurements of turbulence encounters during routine flying in Australia have been summarised on a common basis. The data are insufficient to determine the Australian gust environment although they are not incompatible with the Royal Aeronautical Society data item ESDU 69023. There are, however, indications that at high altitudes (30,000 ft and above) gusts are encountered more frequently than the data item predicts. This is particularly so for the stronger gusts.
Author (GRA)

N82-19786# Air Force Geophysics Lab., Hanscom AFB, Mass.
SPECIFICATION OF CLOUD AMOUNT OVER LOCAL AREAS FROM GOES VISUAL IMAGERY Environmental Research Papers
Thomas J. Keegan 28 May 1981 60 p refs
(AD-A109325; AFGL-TR-81-0153; AFGL-ERP-743) Avail: NTIS HC A04/MF A01 CSCL 04/2

Albedos derived from GOES visual imagery data are compared with the cloud cover reported at seven sites in the northeastern United States in the spring through autumn of 1977 and 1978. The data sample was closely edited to remove all cases containing unexplainable inconsistencies between the satellite and surface data. Statistics were generated for the aggregate of stations for spring/summer and autumn periods separately, as well as the two years separately. The seasonal data were further divided into those cases that contained predominantly ice crystal clouds or water clouds. The characteristics of the satellite data were computed for a 9 by 9 one-mile pixel box and were the average, maximum and minimum albedos, the range of albedo, and the texture. Detailed attention was given to the relationship between average albedo and cloud amounts. Equations were generated for each station for each year for the water droplet clouds during the spring/summer season. There were not sufficient cases to do the same for the autumn of the ice crystal cloud cases. There is a logical, consistent variation in the equations from station to station despite noisy data and a serious shortage of data throughout most of the scattered and broken cloud cover ranges. A multivariate analysis including infrared characteristics is indicated. Author (GRA)

N82-19787# Scripps Institution of Oceanography, La Jolla, Calif. Visibility Lab.
SPRING AND FALL MEASUREMENTS OF EUROPEAN VERY LOW ALTITUDE VOLUME SCATTERING COEFFICIENTS Interim Report
Richard W. Johnson Aug. 1981 22 p refs
(Contract F19628-78-C-0200; AF Proj. 7670)
(AD-A108879; SIO-REF-81-33; SRI-17; AFGL-TR-81-0237)
Avail: NTIS HC A02/MF A01 CSCL 04/2

This report presents measurements of atmospheric volume scattering coefficients collected during 25 low altitude flights made mostly during the spring and fall seasons of 1976 and 1977 at four different European locations. The measurements were conducted during an instrumented aircraft's final approach and landing at its staging airbase. The measurements were made using a pseudophotopic spectral response and thus are suitable for comparison with data associated with standard visual determinations of airfield visibility. The data illustrate that in 22 of 25 cases, there was little or no significant variation in the value of scattering coefficient as the aircraft approached the surface from an altitude of several hundred meters.
Author (GRA)

N82-19788# Wisconsin Univ. - Madison. Space Science and Engineering Center.
THE DEVELOPMENT AND TESTING OF METHODS TO

INFER MIDLATITUDE PRECIPITATION INTENSITY FROM GEOSYNCHRONOUS SATELLITE INFRARED DATA

John V. Zapotocny, Donald R. Johnson, and Thomas M. Whittaker Hanscom AFB, Mass. AFGL 31 Jul. 1981 90 p refs (Contract F19628-78-C-0137; AF Proj. 6670) (AD-A108881; SCIENTIFIC-3; AFGL-TR-81-0252) Avail: NTIS HC A05/MF A01 CSCL 04/2

In an attempt to aid development of simple techniques applicable in middle latitudes, this study addresses the inference of precipitation intensity and its temporal change associated with imbedded convective activity at a location in areas of continuous stratiform precipitation from Geosynchronous Operational Environmental Satellite (GOES) IR digital data. Imbedded convective activity is easily identified in high resolution visible GOES imagery if high cloud layers are not present to obscure the convection. At low Sun angles with the shadowing effect of the convective towers, details of these convective areas are especially enhanced. However, with the need for these methods to be applicable during both daytime and nighttime hours, only the IR 11 micron channel data were used in this study which was based on several synoptic cases. In each of the cases examined, visible and IR imagery and loops were used to help pinpoint optimum areas for study. GRA

N82-19789# Kiruna Geophysical Inst. (Sweden).

STUDIES OF THE STRATOSPHERIC AND MESOSPHERIC WIND SYSTEM AND TEMPERATURE DISTRIBUTION FROM OBSERVATIONS OF INFRASONIC WAVES GENERATED DURING REGULAR CONCORDE FLIGHTS

Ludwik Liszka Sep. 1981 16 p refs Presented at Intern. Symp. on Acoustic Remote Sensing of Atmosphere and Oceans, Calgary, Canada, 22-25 Jun. 1981 (KGI-176; ISSN-0347-6405) Avail: NTIS HC A02/MF A01

The applications of infrasonic recording to atmospheric studies are discussed and results from Concorde flight observations at four recording stations are presented. The Concorde aircraft is considered as an infrasonic source located at a known distance, strong enough to be recorded at distances of up to 5000 km. It is assumed that the direction of propagation of the infrasound produced by the aircraft is determined by the Mach cone, i.e. basic principles of geometrical acoustics are applied. At each station, azimuth and horizontal phase velocity of the arriving signal were recorded as a function of time. As the propagation of infrasound in the atmosphere is strongly influenced by wind and temperature profiles, Concorde recordings in the infrasonic range provide information about the atmosphere-horizontal wind and temperature variations. Variations in propagation time, angle of arrival and phase velocity of recorded infrasonic signals are interpreted in terms of temporal and spatial variations of the wind system. Author (ESA)

N82-19790# Food and Agriculture Organization of the United Nations, Rome (Italy). Remote Sensing Centre.

PRECIPITATION ASSESSMENT FROM ENVIRONMENTAL SATELLITE DATA FOR NORTHWEST LIBYA INCLUDING THE GEFARA PLAN

A. vanDijk 1981 50 p refs (RSC-4) Avail: NTIS HC A04/MF A01

The FAO precipitation assessment technique (satellite imagery combined with rain gage data) was applied to NW Libya to improve precipitation monitoring in this data sparse region. A 21 day period containing a few dry days, a heavy rainstorm, then a few more dry days was chosen. Rain gages reported 3 days of heavy rainfall, but failed to detect 2 further days with rain indicated by satellite data. The FAO rainfall maps appear more reliable than rain gage ones. The application of the technique to the whole of Libya, using Meteosat 2, and 10 reliable, well distributed rain gages, in combination with selected rain gages in South Italy, Tunisia and West Egypt is suggested. Author (ESA)

N82-19791# Bureau of Reclamation, Denver, Colo. Office of Atmospheric Resources Research.

THERMODYNAMIC FEATURES AFFECTING CONVECTIVE CLOUD GROWTH AND DYNAMIC SEEDING: A COMPARATIVE SUMMARY OF HIPLEX SOUNDINGS, 1975 TO 1977 Thermodynamic Cloud Model Analyses

David A. Matthews Jul. 1981 207 p refs (PB82-123423) Avail: NTIS HC A10/MF A01 CSCL 04B

The summary is based primarily on rawinsonde data observed at Miles City, MT., Goodland, KS., and Big Spring, TX., during the summer months of 1975-77, as part of HIPLEX (High Plains Cooperative Program). Data were stratified according to the occurrence or nonoccurence of convective clouds and, when clouds occurred, according to cloud type as seen in geosynchronous satellite imagery. Geographic comparisons show significant variations from north to south over the high plains--the most intense convection occurring in the central and southern plains, the least intense in the north. Large annual variations were noted in mean values of the thermodynamic features at each site among the three summers. GRA

N82-19792# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

TURBULENCE STATISTICS FOR DESIGN OF WIND TURBINE GENERATORS

J. C. Kaimal, J. E. Gaynor, and D. E. Wolfe Dec. 1980 109 p refs Sponsored in part by DOE (PB82-112939; NOAA-81082702; Rept-3) Avail: NTIS HC A06/MF A01 CSCL 04B

Characteristics of moments and probability distributions for two high-wind episodes are examined in depth. The two episodes represent entirely different stability conditions. Statistics for the GUST 0 and GUST 1 models for different heights and bandpass filters are the main focus. Author (GRA)

N82-19793# National Meteorological Center, Washington, D.C.

CLIMATE ANALYSIS CENTER USERS CONFERENCE Final Report

Jul. 1981 43 p Conf. held in Gettysburg, Pa., 12-14 May 1981 (PB82-113325; NOAA-81082102) Avail: NTIS HC A03/MF A01 CSCL 04B

The primary intent of this conference was to examine more fully the needs and problems of the principal users of the products and services of the Climate Analysis Center (CAC). With this information at hand CAC plans to focus its activities to satisfy as broad a spectrum of requirements (from private industry, university, and state and federal agencies) as possible. Specific objectives were: inform users about CAC products, services, and plans; define principal user needs for existing and planned CAC products and services; suggest new products and services, particularly those tailored for specialized user applications. GRA

N82-19794# National Oceanic and Atmospheric Administration, Miami, Fla. Atlantic Oceanographic and Meteorological Labs.

AUSTRALIAN TROPICAL CYCLONES KERRY AND ROSA, FEBRUARY - MARCH 1979

Robert C. Sheets and Greg Holland (Bureau of Meteorology, Melbourne, Australia) May 1981 145 p refs (PB82-114182; NOAA-TM-ERL-AOML-46; NOAA-81082502) Avail: NTIS HC A07/MF A01 CSCL 04B

Flights by highly instrumented research aircraft into Southern Hemisphere tropical cyclones were made into Australian Tropical Cyclones Kerry and Rosa of 1979. Three flights were made into Kerry and one into Rosa with one of NOAA's P-3 research aircraft. Data collected during these flights are presented along with a brief discussion of the major features of the structures of these storms as revealed by these data sets. GRA

N82-19795# Florida State Univ., Tallahassee. Dept. of Meteorology.

THE TWENTY YEAR AVERAGE ATMOSPHERIC STRUCTURE AT LIMA, PERU M.S. Thesis

Jay Anthony Albrecht Jun. 1981 92 p refs (Grant NSF ATM-78-10814) (PB82-114216; NSF/IDOE-81-43; FSU-MET-STU-81/1) Avail: NTIS HC A05/MF A01 CSCL 04B

Rawinsonde observations taken at Lima, Peru are used to calculate twenty year average soundings and deviations from them. The average soundings are used to document the seasonal variations in the atmospheric structure at Lima. Five millibar average soundings are compared to fifty millibar average soundings to show that higher vertical resolutions are necessary when studying the mean atmospheric structure at locations where

day to day variations are small and strong, persistent subsidence inversions are present much of the time. Temperature anomalies in the lower marine layer are found to be approximately equal to the sea surface temperature anomalies. Author

N82-19796# Florida State Univ., Tallahassee. Dept. of Meteorology.
COASTAL UPWELLING ECOSYSTEMS ANALYSIS. ATLAS OF THE JOINT I AIRCRAFT WINDS FOR THE 500 FOOT LEVEL Final Report
D. W. Stuart, A. I. Watson, and W. P. Duval Jun. 1981 73 p refs
(Grant NSF OCE-77-27735)
(PB82-114703; NSF/IDOE-81-44; FSU-MET-STU-81/2; NSF/IDOE/CUEA/TR-39) Avail: NTIS HC A04/MF A01 CSCL 04B

Maps of winds at 500 ft are presented for 17 individual flights and for 3 mean wind regimes using aircraft data gathered during daytime flights made in February-March 1974 as part of JOINT I. The total wind field is shown by maps of the streamlines and isotachs while the north-south component is shown by maps of isotachs and averaged offshore and alongshore profiles. GRA

N82-19797# Electronic Techniques, Inc., Fort Collins, Colo.
SCPP FORECASTING SUPPORT Interim Progress Report, 1 Jul. 1980 - 30 Jun. 1981
J. Owen Rhea, John L. LeCompte, Arlen W. Huggins, Gilbert L. Hemmer, and Arunas P. Kuciauskas Sep. 1981 340 p refs
(Contract DI-9-07-85-Vol-021)
(PB82-123167) Avail: NTIS HC A15/MF A01 CSCL 04B

The objectives of the Sierra Cooperative Pilot Project (SCPP) are to develop a better understanding of the physical processes of precipitation formation and to identify those conditions that provide the best potential for enhancement of winter precipitation. The project is designed to test the feasibility of using weather modification for improving water resources in the Sierra Nevada. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-19798 Institute of Oceanographic Sciences, Birkenhead (England). Bidston Observatory.
PUBLICATIONS AND REPORTS OF THE INSTITUTE OF OCEANOGRAPHIC SCIENCES 1973-1978
K. D. Jones, ed. 1981 157 p refs
(IOS-R-122) Avail: Issuing Activity

Over 800 oceanographic papers, data special and cruise reports are listed. Topics covered include research methods, effects on climate, wave studies, currents, continental shelves, and tides. Author (ESA)

N82-19799*# City Coll. of the City Univ. of New York. Inst. of Marine and Atmospheric Sciences.
MONTE CARLO STUDIES OF OCEAN WIND VECTOR MEASUREMENTS BY SCATT: OBJECTIVE CRITERIA AND MAXIMUM LIKELIHOOD ESTIMATES FOR REMOVAL OF ALIASES, AND EFFECTS OF CELL SIZE ON ACCURACY OF VECTOR WINDS Final Report
Willard J. Pierson Feb. 1982 344 p refs
(Contract NAS1-15669)
(NASA-CR-165837-1) Avail: NTIS HC A15/MF A01 CSCL 08C

The scatterometer on the National Oceanic Satellite System (NOSS) is studied by means of Monte Carlo techniques so as to determine the effect of two additional antennas for alias (or ambiguity) removal by means of an objective criteria technique and a normalized maximum likelihood estimator. Cells nominally 10 km by 10 km, 10 km by 50 km, and 50 km by 50 km are simulated for winds of 4, 8, 12 and 24 m/s and incidence angles of 29, 39, 47, and 53.5 deg for 15 deg changes in direction. The normalized maximum likelihood estimate (MLE) is correct a large part of the time, but the objective criterion technique is recommended as a reserve, and more quickly computed, procedure. Both methods for alias removal depend on the differences in the present model function at upwind and downwind. For 10 km by 10 km cells, it is found that the MLE method introduces a correlation between wind speed errors and aspect angle (wind direction) errors that can be as high as 0.8 or 0.9 and that the wind direction errors are unacceptably large, compared to those obtained for the SASS for similar assumptions. Author

N82-19800*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
WAVE SPECTRA OF A SHOALING WAVE FIELD: A COMPARISON OF EXPERIMENTAL AND SIMULATED RESULTS
W. D. Morris, C. E. Grosch (Old Dominion Univ.), and L. R. Poole Jan. 1982 33 p refs
(NASA-TM-83211) Avail: NTIS HC A03/MF A01 CSCL 08C

Wave profile measurements made from an aircraft crossing the North Carolina continental shelf after passage of Tropical Storm Amy in 1975 are used to compute a series of wave energy spectra for comparison with simulated spectra. Results indicate that the observed wave field experiences refraction and shoaling effects causing statistically significant changes in the spectral density levels. A modeling technique is used to simulate the spectral density levels. Total energy levels of the simulated spectra are within 20 percent of those of the observed wave field. The results represent a successful attempt to theoretically simulate, at oceanic scales, the decay of a wave field which contains significant wave energies from deepwater through shoaling conditions. M.D.K.

N82-19801*# National Aeronautics and Space Administration, Washington, D. C.
NASA OCEANIC PROCESSES PROGRAM, FISCAL YEAR 1981 Annual Report
Mar. 1982 132 p refs
(NASA-TM-84467) Avail: NTIS HC A07/MF A01 CSCL 08C

Summaries are included for Nimbus 7, Seasat, TIROS-N, Altimetry, Color Radiometry, in situ data collection systems, Synthetic Aperture Radar (SAR)/Open Ocean, SAR/Sea Ice, Scatterometry, National Oceanic Satellite System, Free Flying Imaging Radar Experiment, TIROS-N/Scatterometer and/or ocean color scanner, and Ocean Topography Experiment. Summaries of individual research projects sponsored by the Ocean Processes Program are given. Twelve investigations for which contracting services are provided by NOAA are included. N.W.

N82-19802# Electronics Research Lab., Adelaide (Australia).
AN AERIAL SURVEY OF WATER TURBIDITY AND LASER DEPTH SOUNDING PERFORMANCE ALONG THE QUEENSLAND COAST
D. M. Phillips and R. H. Abbot Apr. 1981 29 p refs
(AD-A109050; ERL-0192-TR) Avail: NTIS HC A03/MF A01 CSCL 08/10

The performance of the WRELADS laser airborne depth sounder has been assessed in North Queensland coastal waters from Townsville to Torres Strait. This was achieved by recording water turbidity and maximum sounding depth in the aircraft along the flight path. The parameter used in the aerial survey as a measure of water turbidity was related to beam attenuation coefficient measured from a boat in a joint aircraft and boat trial. Data relating the statistical distribution of turbidity to water depth were obtained and compared with the observed performance characteristic in order to indicate the proportion of Queensland coastal waters suitable for sounding with an airborne laser sounder. Author (GRA)

N82-19803# SACLANT ASW Research Center, La Spezia (Italy). Underwater Research Div.
THE SACLANTCEN OCEANOGRAPHIC DATA BASE. VOLUME 2: ACCESS, INTERROGATION AND DISPLAY
Richard F. J. Winterburn 15 Jun. 1981 58 p refs
(AD-A109417; SACLANTCEN-SM-151) Avail: NTIS HC A04/MF A01 CSCL 05/2

An oceanographic data base established at SACLANTCEN on an 'in-house' UNIVAC 1106 computer system is described.

Volume I discusses the design criteria used in setting up the data base, lists its structure and content, and explains how acquired data, either from outside institutions or from SACLANTCEN experiments are re-formatted and entered. Volume II describes how data are accessed, interrogated, and displayed, including the plotting of charts with coastlines and of contoured data.
Author (GRA)

N82-19804# Louisiana State Univ., Baton Rouge. Dept. of Civil Engineering.
PREDICTION OF SURF ZONE CHARACTERISTICS Final Report, 1979-1981
Joseph N. Suhayda and Gerald F. McHugh 4 Jul. 1981 70 p refs
(Contract N00014-79-C-0342; NR Proj. 388-152)
(AD-A108759) Avail: NTIS HC A04/MF A01 CSCL 20/4

This report presents the results of the development and testing of predictive models for computing surf zone characteristics from wave measurements made outside the surf zone. The surf zone characteristics predicted are average breaker height, maximum breaker height, average breaker position, maximum breaker position, breaker type, average longshore current and maximum longshore current. Preliminary field tests indicate breaker height prediction was within + or - 10% for wave heights of about 1 meter.
Author (GRA)

N82-19805# Ecole Nationale Superieure des Mines, Valbonne (France). Centre de Teledetection et d'Analyse des Milieux Naturels.
THE TOCIND EXPERIMENT Final Report [EXPERIENCE TOCIND]
L. Wald Paris ESA Jul. 1981 21 p refs In FRENCH Sponsored in cooperation with CNES
(Contract ESA-4423/80/F-FC(SC))
(CTAMN/81/R/10; ESA-CR(P)-1479) Avail: NTIS HC A02/MF A01

The relation between surface isotherms and current is discussed. Predicting surface current from satellite thermographs is investigated. Ship measurements of Indian Ocean currents are compared with Meteosat images. Extensive cloud cover makes it impossible to compare results. Results from a horizontal heat advection model agree closely with measurements. Author (ESA)

N82-19806# Maryland Univ., Solomons. Biological Lab.
ESTUARINE COMMUNITY DYNAMICS BENTHIC PROGRAM, PATUXENT RIVER ESTUARY, PRELIMINARY DATA REPORT
W. R. Boynton, W. M. Kemp, C. G. Osborne, E. Spalding, and C. W. Keefe Annapolis, Md. Maryland Power Plant Siting Program Jun. 1981 63 p refs
(PB82-108689; ; UMCEES-81-52-CBL; PPSP-CP-81-2) Avail: NTIS HC A04/MF A01 CSCL 08A

Sedimentation, resuspension, benthic respiration, nutrient flux, and plankton metabolism rates were measured at four locations along the Patuxent Estuary during 1979-80. Measurement techniques are described and data are reported. GRA

N82-19807# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Environmental Lab.
ANALYSIS OF METHODOLOGIES USED FOR THE ASSESSMENT OF WETLANDS VALUES: APPENDICES C-E
Robert I. Lonard, Ellis J. Clairain, Jr., Robert T. Huffman, J. W. Hardy, Linda D. Brown, Paul E. Ballard, and Janet W. Watts Sep. 1981 450 p refs Sponsored in part by Water Resources Council
(PB82-110362) Avail: NTIS HC A19/MF A01 CSCL 08J

An appendice C-E to analysis methodology used for the assessment of wetlands values is presented. It consists of wetlands evaluation procedures satisfying evaluation criteria, sample criteria form, sample descriptive characteristics form, and criteria and descriptive characteristics forms for each procedure. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-19808 Texas A&M Univ., College Station.
BIOCHEMICAL, PHYSIOLOGICAL AND ECOLOGICAL ASPECTS OF AMMONIUM REGENERATION BY MARINE CRUSTACEANS Ph.D. Thesis
Robert Richard Bidigare 1981 122 p
Avail: Univ. Microfilms Order No. 8128874

Laboratory investigations were carried out with the marine mysid, Praunus flexuosus, to assess the degree of coupling between glutamate dehydrogenase (GDH) activity and the rate of whole animal ammonium excretion. A strong correlation between GDH activity and rate of ammonium excretion by this mysid confirmed that ammonium excretion rates could be accurately predicted by employing the enzyme assay presented here. GDH activity surveyed in different taxa of marine crustaceans was higher in muscle tissue extracts than in gill tissue extracts or in a whole animal homogenate. Zooplankton excretion experiments conducted during austral spring and summer in the Scotia Sea, Antarctica, showed that weight-specific ammonium excretion increased both with increasing ambient temperature and with decreasing body size. The GDH assay appears useful as an alternative method to the traditional time-course, animal-in-a-jar experiments for quantifying zooplankton excretion impacts in the world oceans. Used in conjunction with the ETS assay, the GDH assay is a sensitive tool for surveying depths of maximal grazing and/or predation. Dissert. Abstr.

N82-19809*# General Electric Co., Fairfield, Conn. Space Div.
LIFE SCIENCES PASSIVE GN2 FREEZER THERMAL PERFORMANCE TEST Summary Report
G. W. Belshaw 13 Nov. 1981 79 p
(Contract NAS9-15629)
(NASA-CR-167546) Avail: NTIS HC A05/MF A01 CSCL 06C

Thermal performance tests that were conducted on the life sciences passive GN2 freezer project are summarized as well as the improvements to the freezers to improve the thermal performance of the containers. Procedures were developed, based upon these tests, to initially charge the freezers with LN2 and verify that the freezer performance is adequate for the mission duration. Improvements were made to the corvac sample tube to limit the amount of breakage due to thermal expansion of the liquid during freezing. A method of verifying the freezer vacuum insulative integrity was defined as well as a procedure for refurbishment of the internal vacuum level. Freezer modifications were made to ease the reevacuation of the containers. The orientation of the freezer in a 1-G environment, after being charged, had to remain in a vertical position. The LN2 boiloff rate increased significantly in a horizontal position. This resulted in a stowage definition in the spacecraft prior to launch. Functional testing, using the SL-1 mission timeline showed that the freezer will maintain samples in the frozen state for the duration of the mission. S.L.

N82-19810# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
STUDY OF THE KINETICS OF OXYGEN SATURATION OF FLUOROCARBON EMULSIONS
Yu. D. Aprosin, V. K. Alekseeva, and N. I. Afonin 1982 20 p refs Transl. into ENGLISH from Vop. Med. Khim. (Russia), v. 26, no. 6, 1980 p 793-799
(ISSN-0077-5606; NRC/CNR-TT-2007) Avail: NTIS HC A02/MF A01

The use of fluorocarbon emulsions as blood substitutes is addressed. Specifically, the mechanism of oxygen absorption by perfluorotributyl amine (PFTBA) emulsions is examined. The functional dependence of the absorption constant on various parameters (viscosity, temperature, and concentration of PFTBA in the emulsion) was established, and a comparative analysis of the efficiency of gas transport by the emulsion and by blood was carried out. M.G.

N82-19811# Ball State Univ., Muncie, Ind. Dept. of Biology.
DETERMINATION OF THE EFFECTS OF MATERIAL FROM ALTERNATE ENERGY SOURCES ON THE UPPER RESPIRATORY TRACT CLEARANCE MECHANISM. PART 1: IN VITRO EXPOSURE TO PARTICULATE POLLUTANTS.

PART 2: IN VIVO EXPOSURE TO OZONE Final Report
Dorothy Adalis Sep. 1981 75 p refs
(Contract EPA-68-02-2295)
(PB82-117037; EPA-600/1-81-067) Avail: NTIS HC A04/MF A01 CSCL 06T

Studies were conducted to measure the toxic effects of a variety of substances from the environment on the clearance mechanism of the upper respiratory tract using an in vitro hamster model system. Studies using hamsters for in vivo exposures to ozone were also conducted to determine the effects of ozone on the cilia beat frequency and cytopathology of the tracheal epithelium. Organ cultures of hamster tracheal tissue were exposed to graded concentrations of pollutants to determine effects on the respiratory cilia. Parameters studied were beat frequency, ciliostasis, cytopathology, and ATP concentration.
GRA

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-19812 Utah Univ., Salt Lake City.
NUMERICAL AND EXPERIMENTAL STUDIES OF ELECTROMAGNETIC NEAR-FIELD ENERGY ABSORPTION IN MODELS OF MAN Ph.D. Thesis
Indira Chatterjee 1981 156 p
Avail: Univ. Microfilms Order No. 8125898

The Plane Wave Spectrum approach was used to numerically evaluate the electromagnetic fields and energy absorption in models of man subjected to near-zone leakage fields. Three models were considered: a homogeneous semi-infinite slab model, a layered slab model, and an inhomogeneous 180 cell block model. The numerical results show the strong dependence of energy absorption on the characteristics of the prescribed leakage fields. Results are presented, both for plane waves at various angles of incidence and for near-zone leakage fields. The importance of phase and amplitude variations in the prescribed leakage field is evaluated. A highlight of this work is the considerably reduced energy absorption for near-field partial-body exposures as compared to that obtained for far-field exposure conditions. Experimental results supporting the validity of the empirical relationships are presented. Dissert. Abstr.

N82-19813 Texas A&M Univ., College Station.
CATECHOLAMINE LEVELS IN FIT AND NONFIT MALES WHEN EXPOSED TO AN EMOTIONAL STRESS Ph.D. Thesis
Camille Jeanette Bunting 1981 123 p
Avail: Univ. Microfilms Order No. 8128877

The difference in catecholamine (CA) excretion levels and perceived anxiety levels between physically fit and nonfit human subjects when exposed to an emotional stress was studied. The differences in heart rate responses between physically fit and nonfit subjects, as well as the difference in CA excretion levels and perceived anxiety levels between individuals classified as introverts and extraverts were also studied. Rock climbing was selected as the experimental stress factor. The results of the analysis for the fit and nonfit classifications indicated significant differences in epinephrine (E) excretion levels and responses on the Spielberger State Anxiety Inventory (SSAI) between treatments, as well as significant groups x treatments interaction for norepinephrine (NE) excretion levels. Significant groups x treatments x times and treatments x times x activities interactions were found for heart rate. Analysis for the introvert and extravert classifications revealed significant differences in NE excretion levels and SSAI responses between treatments, as well as a significant groups x treatments interaction for E excretion levels.
Dissert. Abstr.

N82-19814*# General Electric Co., Houston, Tex. Systems Dept.
ANALYSIS OF EVAPORATIVE WATER LOSS IN THE SKYLAB ASTRONAUTS
J. I. Leonard 19 Dec. 1977 77 p refs
(Contract NAS9-14523)
(NASA-CR-167462) Avail: NTIS HC A05/MF A01 CSCL 06P

Daily evaporative water losses (EWL) during the three Skylab missions were measured using the indirect mass and water balance techniques. A mean inflight EWL of 860 ml/day-m 2 was obtained for nine men who averaged one hour of daily exercise. Although it was expected the EWL would increase in the hypobaric environment of Skylab (1/3 atmosphere), an average decrease from preflight sea level conditions of 11 percent was measured. The results suggest that weightlessness may have been a factor in modifying EWL primarily by decreasing sweat losses during exercise and possibly by reducing insensible skin losses as well. The weightless environment apparently promotes the formation of a sweat film on the skin surface both directly, by reducing heat and mass convective flow and sweat drippage, and perhaps indirectly by inducing measurable biochemical changes resulting in high initial sweating rates. It is proposed that these high levels of skin wettedness favor sweat suppression by a previously described mechanism.
Author

N82-19815*# Baylor Univ., Houston, Tex. Dept. of Dermatology.
EVALUATION OF MATERIALS PROPOSED FOR USE IN SPACE FLIGHT Final Report
W. Christopher Duncan Aug. 1981 4 p
(Contract NAS9-16358)
(NASA-CR-167537) Avail: NTIS HC A02/MF A01 CSCL 06Q

The cutaneous primary irritancy and allergenicity potential of cotton shirts/fabrics treated with flame retardants were evaluated in order to establish their suitability for spacecraft crew use. Twenty-five volunteer human subjects were patch tested on the back utilizing standard methodology, with both treated and untreated cotton fabric. The fabric was treated with tetrakis (hydroxymethyl) phosphonium hydroxide and subsequently cured with gaseous ammonia. The final treatment comprised adding on dicyandiamine phosphoric acid. None of the individuals experienced primary irritant or allergic reactions attributable to the fabric during induction or challenge patch testing. Likewise, there were no reactions to treated or untreated fabric patches placed on ten subjects of the usage panel at the conclusion of the study.
R.J.F.

N82-19816# Communications Research Centre, Ottawa (Ontario). Informatics Applications Management Branch.
REVIEW OF HEALTH AND SAFETY ASPECTS OF VIDEO DISPLAY TERMINALS
W. C. Treurniet Feb. 1982 39 p refs
(CRC-TN-712-E) Avail: NTIS HC A03/MF A01

The factors that contribute to worker complaints when video display terminals (VDT) are introduced into the workplace are investigated. Survey data from field experiments indicate that a number of ergonomic factors and job characteristics can contribute to reports of discomfort from VDT users. Specifically, reports of visual discomfort are related to improper ambient lighting (which can cause bothersome reflections and contrast glare), poor display quality, and ophthalmological deficiencies. Reports of muscle pain and fatigue are related to poor workstation design such as improper heights of chair, keyboard, and display screen, and absence of source document holder, and no support for the forearms and wrists. It is noted that the frequency of such complaints is influenced by the worker's attitude regarding the job. A negative attitude arising from performing a meaningless, routine task, or from having no opportunities for career advancement, will result in more complaints due to ergonomic shortcomings. The issue of electromagnetic emissions from television displays is also considered.
B.W.

N82-19817# European Space Agency, Paris (France).
HUMAN CARDIOVASCULAR ADAPTATION TO ZERO GRAVITY
F. Bonde-Petersen, ed., B. Battrick, comp., and J. Mort, comp. Jan. 1981 64 p refs Proceedings of Symp., Copenhagen, 20-21 Apr. 1981. Sponsored in cooperation with Copenhagen Univ.
(ESA-SP-1033; ISSN-0379-6566) Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Methods for investigating the effects of weightlessness on the human body are presented, and the physiological problems caused by zero gravity are discussed. Cardiovascular and hormonal responses, incuding hemodynamic effects and posture influence, are considered. Vestibular, brain and masticatory functions are investigated. Rebreathing techniques are assessed. For individual titles, see N82-19818 through N82-19832.

N82-19818# Technische Univ., Berlin (West Germany).
CURRENT VIEWS AND FUTURE PROGRAMS IN CARDIOVASCULAR PHYSIOLOGY IN SPACE
K. Kirsch *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 3-5 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A microplethysmographic method which charts fluid shifts such as those caused by sudden exposure to zero gravity is described. An ultrasonic probe, calibrated in human tissue layer thickness, measures areas where the underlying bone provides good echos. Tissue volume is calculated from the depth of the tissue cylinder between the skin surface and the bone. Measurements on subjects undergoing tilting confirm that edema occurs preferentially in the lower third of the tibia close to the ankle. Tilting the subject from a slight head down position into the upright position is followed by a decrease of tissue layer thickness above heart level, whereas below heart level the opposite occurs. The effects are reversible. Author (ESA)

N82-19819# Texas Univ. Health Science Center, Dallas.
ADAPTATION TO ZERO GRAVITY AS SIMULATED BY HEAD-DOWN TILT
C. G. Blomqvist, J. V. Nixon, R. L. Johnson, and J. H. Mitchell *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 6-7 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The accuracy of the head down tilt model of adaptation to zero gravity is assessed by comparing test results of subjects undergoing a 24 hr 5 deg tilt with measurements of heart rate, plasma volume, urine production, etc., obtained during and after space flight. The magnitude of the changes in body fluid distribution and the degree of post-tilt cardiovascular dysfunction closely resemble space results. Results indicate that the cardiovascular system adapts rapidly and efficiently to the central fluid shift that occurs early during exposure to zero gravity. Hemodynamic changes are transient with a nearly complete return to the control state within 6 hrs. The adaptation is achieved primarily by a diuresis and a decrease in blood volume, mediated by ADH, renin, and aldosterone inhibition. Author (ESA)

N82-19820# Kobenhavns Amts Sygehus i Glostrup (Denmark).
CLINICAL PHYSIOLOGY OF THE RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM
J. Giese *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 8-9 (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Methods for studying the renin-angiotensin-aldosterone system are reviewed. Plasma renin concentration measurements, referred to the international standard, are advocated as a way of standardizing measures obtained by different methods. Plasma concentration of angiotensin 2 is the most suitable measurement. Saralasin and converting enzyme inhibitors are good angiotensin 2 blockers. Tetrahydroaldosterone excretion measurement is a satisfactory method for studying aldosterone secretion.
Author (ESA)

N82-19821# Kommune Hospital, Copenhagen (Denmark).
CARDIOVASCULAR REFLEXES DURING UPRIGHT POSITION
O. Henriksen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 10-12 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Control systems involved in compensatory changes in vascular conductance in response to postural changes are described. Studies of blood flow regulation in subcutaneous limb tissue during changes of vascular transmural pressure are cited. Evidence suggests that constriction of the vessels in the skin contributes to the decrease in total vascular conductance in upright position. Both remote sympathetic reflex mechanisms elicited by a decrease in baroreceptor activity, and local sympathetic (axon) reflex mechanisms elicited by venous distension participate in pressure regulation during upright position. Author (ESA)

N82-19822# Technische Univ., Berlin (West Germany).
VOLUME REGULATING HORMONES AND THEIR ROLE IN THE CARDIOVASCULAR ADAPTATION TO ZERO GRAVITY
L. Roecker *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 18-20 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Neurohormonal control of plasma volume is postulated. A change in blood volume is sensed by cardiovascular receptors which transmit this information up to the central nervous system. From there two main routes are involved, the antidiuretic hormone (ADH) mechanism for the water, and the sympathetic renin-angiotensin-aldosterone-system for sodium control. Diuresis measurements during water immersion, negative pressure breathing, and prolonged bed rest support this concept. Evidence suggests that ADH is the key to volume control of the circulation system, but the low physiological concentrations of ADH, especially under weightless conditions, make detection difficult. Thermal dehydration tests indicate that factors other than osmolality control ADH secretion under long term negative water balance. Author (ESA)

N82-19823# Nara Women's Univ. (Japan).
CARDIOVASCULAR RESPONSES TO ISOMETRIC EXERCISE IN SITTING AND LYING POSITION
T. Sadamoto, F. Bonde-Petersen, and Y. Suzuki *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 21-24 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Cardiovascular responses to static exercises in the sitting and lying positions, which simulated 1 g and 0 g, were studied. Subjects were investigated during and after 2 min of sustained isometric exercise performed as knee extension, plantar flexion or handgrip at a tension of 40% of maximum voluntary contraction. Heart rate, arterial pressure, and blood flow were recorded. In the two positions, where the force of gravity was varied but where the conditions in the exercising muscles were identical, there was a significant difference in mean arterial pressure (MAP). The effect of isometric exercise on MAP is reduced in the lying position due to the decreased sympathetic nervous activity (SNA). Increments in forearm blood flow and forearm vascular resistance indicate that the baroreceptors are active in both cases. Lower heart rate, MAP and forearm vascular resistance as well as increased forearm blood flow during rest in the lying as compared to the sitting position are attributed to differences in SNA.
Author (ESA)

N82-19824# Texas Univ. Health Science Center, Dallas.
HEMODYNAMIC EFFECTS OF LOWER BODY POSITIVE PRESSURE
F. A. Gaffney, E. R. Thal, W. F. Taylor, B. C. Bastian, J. A. Weigelt, J. M. Atkins, and C. G. Blomqvist *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 25-26 ref (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The way in which medical antishock trousers increase arterial pressure is examined. Supine and 60 deg head up tilt blood pressure, heart rate, forearm muscle flow, cardiac output and stroke volume measurements on healthy adults in garments with 10 and 100 mm Hg pressures are presented. Results show that the garment acts as a local, effective, nonpharmacologic, vasoconstrictor. In supine normovolemic subjects it raises pressure by increased afterload. During head up tilt, venous pooling in

the legs decreases stroke volume and cardiac output.
Author (ESA)

N82-19825# Copenhagen Univ. (Denmark).
CARDIOVASCULAR REACTIONS TO TILT AND LOWER BODY POSITIVE PRESSURE (LBPP)
F. Bonde-Petersen, Y. Suzuki, T. Sadamoto, and T. Staehr-Johansen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 27-29 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The difference in the reaction of the heart towards increasing total peripheral resistance passively, as during lower body positive pressure (LBPP), and actively, as during head up tilt, is examined. Standard measures were taken of subjects tilted at 25 deg (head up, head down) and in anti-g suits inflated to 60 or 120 mm Hg. For passive increase, a substantial increase in afterload does not affect cardiac output (CO). For active increase, CO is decreased without any significant increase in afterload, due to the decreased venous return. For LBPP applied in the sitting position (where venous return also is reduced) there is no increase in venous return and CO, although mean arterial pressure rises, probably due to the mechanical compression of the vascular beds in the legs. Author (ESA)

N82-19826# University Hospital, Copenhagen (Denmark).
MEASUREMENTS OF VESTIBULAR FUNCTION
S. Vesterhauge and K. Zilstorff *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 33-34 (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Vestibular reflexes used for measuring vestibular function are discussed, including vestibular sensations, vestibular vegetative vestibulo-spinal, and vestibulo-ocular reflexes. Most human displacements consist of linear accelerations/decelerations, which stimulate otolith organs, but angular accelerations provoked by rotatory movements which stimulate the semicircular canals, give rise to more compensations, so it is on these that clinical interest centers. Understanding of the interactions between the semicircular canal otolith functions and the rest of the system is hampered by the difficulty of isolating the effect of the peripheral sense organs, since the system adapts well to defects in sensory input. Zero gravity experiments are a step towards developing more sensitive measurement techniques for vestibular functions.
Author (ESA)

N82-19827# Kobenhavns Amts Sygehus i Gentofte, Hellerup (Denmark).
CEREBRAL HEMODYNAMICS AT ZERO GRAVITY
J. Olesen *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 35-36 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

Investigations on the effects of weightlessness and increased gravity on cerebral pressure autoregulation in man and animals are reviewed. Mean arterial blood pressure (MABP) was altered by vasoactive drugs, by a pneumatic cuff, and by posture changes. Test pilots' medical histories and the reactions of patients subjected to extirpation of external and internal jugular veins during bilateral radical dissection for neck carcinoma are considered. Artificial spinal fluid was infused into animals in order to increase intracranial pressure. Results show that cerebral blood flow is unchanged between perfusion pressures of 60 to 150 mm Hg MABP, and that substantial increases in cerebral venous pressure do not impair intellectual capacity. Therefore high g forces during ascent and weightlessness do not overload the autoregulation mechanism. Author (ESA)

N82-19828# Royal Dental Coll., Copenhagen (Denmark).
THE ETIOLOGY OF FACIAL PAIN AS RELATED TO MASTICATORY MUSCLES
E. Moeller *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 37-41 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The link between chewing and facial pain in subjects with functional disorders of the masticatory system was tested. Blood flow in mandibular elevators was assessed by local isotope clearance using Xenon 133. Intercuspal biting at 25% or more of full effort for 90 sec causes obstruction or impairment of blood flow in the muscles. Deliberate unilateral mastication for 90 sec in a normal subject produces post exercise hyperemia in the most vigorously acting muscles. Since the degree of activity exerted by the elevators during mastication typically exceeds 50% of full effort, only pauses between the bursts of activity in the opening movement are available for blood flow. During part of these periods stretching of the elevators limits the capacity for circulation. This suggests that impaired blood flow due to contraction is the source of the pain. Author (ESA)

N82-19829# Copenhagen Univ. (Denmark).
MEASUREMENTS OF INTRA AND EXTRACELLULAR WATER SPACES AND ELECTROLYTE CONCENTRATIONS IN HUMAN SKELETAL MUSCLE
G. Sjoegaard *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 43-44 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A method for measuring the extracellular space in small muscle biopsies was developed. For each 70 kg body weight, 2 mCi of sup 3H inulin is injected. Extracellar water content (H2Oe) is calculated from: H2Oe ml/100 g d.w. muscle tissue = (sup 3H activity/100 g d.w. muscle tissue)/(sup 3H activity/ml plasma H2O). The magnitude of H2Oe in the soleus (high % slow twitch fibers) triceps brachii (high % fast twitch) and vastus lateralis (equal number slow and fast twitch) was calculated. The total water content was 318 (298-342) ml/100 g d.w. for the three muscles. This indicates that factors other than fiber composition, e.g., the hydrostatic effect, are responsible for H2Oe magnitude differences. The method can measure reductions in muscle water spacing in the lower body caused by adaptation to zero gravity, and whether this is accompanied by electrolyte concentration changes. Author (ESA)

N82-19830# Texas Univ. Health Science Center, Dallas.
USE OF ACETYLENE REBREATHING METHOD FOR MEASURING CARDIAC OUTPUT DURING PHYSIOLOGICAL AND CLINICAL STUDIES
C. G. Blomqvist *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 45-46 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A modification of the acetylene rebreathing method, suitable for complex or prolonged experiments which require multiple sessions, is presented. A mixture containing 0.5% C2H2, 10% He, 30% O2 with a balance of N2 for a total bag volume of 1.5 to 2.5 l is used. Six ml of C18O is added for pulmonary diffusion capacity determination. Instantaneous C2H2 concentrations are normalized with respect to He, which is not absorbed. Comparison with the standard indocyanine green indicator dilution technique reveals no systematic error. Experimentally induced stroke volume and cardiac output differences of + or - 10% to 15% can be established by standard statistical methods in groups of 5 to 10 subjects. Author (ESA)

N82-19831# Copenhagen Univ. (Denmark).
A COMPARISON BETWEEN ACETYLENE AND FREON REBREATHING FOR MEASURING CARDIAC OUTPUT DURING EXERCISE
P. Norsk, F. Bonde-Petersen, and Y. Suzuki *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 47-49 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

The suitability of freon rebreathing as a noninvasive measurement method in spaceborne microgravity cardiac output tests was examined. Cardiac output, oxygen uptake, blood pressure, and heart rate were measured for subjects with spontaneous, and subjects with forced respiratory rates during rebreathing. Comparison of their results shows that freon can replace acetylene

if a spontaneous breathing rate is used, and if the end tidal gas fractions are corrected for changes in rebreathing volume. Inadequate mixing can be avoided by using an inert, insoluble gas. Author (ESA)

N82-19832# Odense Univ. (Denmark).
ON-LINE, REAL-TIME DETERMINATIONS OF BREATH-TO-BREATH GAS EXCHANGE
J. S. Lundsgaard and J. Groenlund *In* ESA Human Cardiovascular Adaptation to Zero Gravity Jan. 1981 p 50-53 refs (For primary document see N82-19817 10-52)
Avail: NTIS HC A04/MF A01; ESA, Paris FF 55 Member States, AU, CN, and NO (+20% others)

A real-time on-line system which measures respiratory gas uptake and release in noninvasive investigations of cardiac output is described. For respiration, a hot-wire anemometer connected to the computer measures true mass gas flow. The nonlinear relation between flow rate and flow signal, which differs between gases, is accounted for by a calibration table in the computer program. Another flowmeter, which measures inspiration, is connected to the first by an alternating switch. A mass spectrometer samples 20 cu cm/min flow in order to measure partial pressures. Author (ESA)

N82-19833# Ohio State Univ., Columbus. College of Pharmacy.
CHEMICAL AND MOLECULAR BIOLOGICAL ASPECTS ALKYLHYDRAZINE-INDUCED CARCINOGENESIS IN HUMAN CELLS IN VITRO Interim Report, 1 Sep. 1980 - 31 Aug. 1981
Donald T. Witiak Sep. 1981 20 p refs
(Contract F49620-80-C-0086; AF Proj. 2312)
(AD-A109088; AFOSR-81-0864TR) Avail: NTIS HC A02/MF A01 CSCL 06/20

Carbon-14 labeled 1,1-DMH and 1,2-DMH of high specific activity were prepared and utilized, along with 14C-labeled MMH, to study alkylation of DNA and proteins in low passage human neonatal foreskin derived fibroblasts. When human fibroblasts were treated under conditions which would be expected to lead to a negligible number of transformation events, i.e. cells labeled were in a non-growing environment and the dose of methylhydrazine (1.6 microgram/ml) was well below the ED50 value (62-100 microgram/ml), significant differences in DNA and protein methylation were observed. For both protein and DNA, 1,2-DMH produced a higher degree of methylation than 1,1-DMH, with MMH demonstrating the lowest level. The data suggests that in these cells there are significant differences in the metabolic and/or chemical transformation of the methylhydrazines in the proposed active metabolite, methyl diazonium ion. GRA

N82-19834# Naval Health Research Center, San Diego, Calif.
NONAUDITORY EFFECTS OF HIGH INTENSITY NOISE ON GROUND CREWS AT A NAVAL AIR STATION Interim Report
David J. Hord and M. A. Coultas 1981 19 p refs
(MF58524002)
(AD-A108996; NAVHLTHRSCHC-81-27) Avail: NTIS HC A02/MF A01 CSCL 06/19

Physiological, behavioral and subjective data were obtained from 14 ground crew considered possibly to be at risk for nonauditory effects of intense noise while working around jet aircraft. Fourteen matched control subjects working in normal noise environments were given the same test protocol. Brain stem evoked potentials, eye tracking behavior, balance, and nystagmus were compared between the groups and found to be nondiscriminating. In addition, subjective mood and perceived illness were compared and found to be the same in the two groups. It was concluded that ground crew wearing the required ear protection devices do not show nonauditory effects of intense noise encountered on their jobs, and that within the confines of the variables studied, no evidence exists that current safety measures and standards are inadequate. Author (GRA)

N82-19835# Tracor Jitco, Inc., Rockville, Md.
ENVIRONMENTAL AND HEALTH ASPECTS OF ACRYLAMIDE: A COMPREHENSIVE BIBLIOGRAPHY OF PUBLISHED LITERATURE Final Report, 1950 - 1981
Washington EPA Jun. 1981 83 p
(Contract EPA-68-01-5836)
(PB82-110123; EPA-560/7-81-006) Avail: NTIS HC A05/MF A01 CSCL 06I

The citations were selected from a thorough literature search, and broadly classified as having primarily environmental or biological emphasis. The sources used in the search are identified, and for the portion performed on line, the search strategies are also included. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-19836# National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
THE EFFECT OF VISUAL INFORMATION ON THE MANUAL APPROACH AND LANDING
P. H. Wewerinke 16 May 1980 72 p refs
(Contract NIVR-1857)
(NLR-TR-80055-U) Avail: NTIS HC A04/MF A01

The effect of visual information combined with a basic display information on manual approach performance on the manual approach and landing task was studied. A pre-experimental, theoretical analysis in terms of the optimal control model for pilot/aircraft was performed, yielding approach performance predictions which could be compared with the experimental results of a moving base simulator program. The model provides a description of the visual perception process involved in the complex manual approach task, with predictive capability. The complex interaction of a variety of task variables is examined.
Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-19837*# CAE Electronics Ltd., Montreal (Quebec).
SIX DEGREE OF FREEDOM MANUAL CONTROLS STUDY REPORT Final Report
G. M. McKinnon, A. Lippay, and M. L. King [1982] 65 p
(Contract NAS9-15939)
(NASA-CR-167532) Avail: NTIS HC A04/MF A01 CSCL 05H

The feasibility of using degree of freedom manual controls in space in an on orbit environment was determined. Several six degree of freedom controls were tested in a laboratory environment, and replica controls were used to control robot arms. The selection of six degrees of freedom as a design goal was based on the fact that six degrees are sufficient to define the location and orientation of a rigid body in space. S.L.

N82-19838*# SRI International Corp., Menlo Park, Calif.
THE FEASIBILITY OF MINIATURIZING THE VERSATILE PORTABLE SPEECH PROSTHESIS: A MARKET SURVEY OF COMMERCIAL PRODUCTS
Tracy Walklet Nov. 1981 207 p
(Contract NAS2-10143; SRI Proj. 8134)
(NASA-CR-168611) Avail: NTIS HC A10/MF A01 CSCL 05H

The feasibility of a miniature versatile portable speech prosthesis (VPSP) was analyzed and information on its potential users and on other similar devices was collected. The VPSP is a device that incorporates speech synthesis technology. The objective is to provide sufficient information to decide whether there is valuable technology to contribute to the miniaturization of the VPSP. The needs of potential users are identified, the development status of technologies similar or related to those used in the VPSP are evaluated. The VPSP, a computer based speech synthesis system fits on a wheelchair. The purpose was

to produce a device that provides communication assistance in educational, vocational, and social situations to speech impaired individuals. It is expected that the VPSP can be a valuable aid for persons who are also motor impaired, which explains the placement of the system on a wheelchair. E.A.K.

N82-19839# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 5.

HUMAN FACTORS IN SYSTEM DEVELOPMENT: EXPERIENCES AND TRENDS

Bengt Bergstroem, ed., Hans Furustig, ed., and Jeanette Palm, ed. Jun. 1981 156 p refs Proceedings of Symp., Karlstad, Sweden, 24-25 Sep. 1980

(FOA-A-56003-H9) Avail: NTIS HC A08/MF A01

The role of human factors engineering and research in present and future systems development is evaluated. Limitations on the man machine systems design process are pointed out. Status and effectiveness of human factors engineering are assessed. Ergonomic considerations in product design and evaluation are highlighted. Human factors and safety in nuclear power plant operation are discussed. For individual titles, see N82-19840 through N82-19845.

N82-19840# Research Inst. of National Defence, Karlstad (Sweden).

HUMAN FACTORS AND THE REAL WORLD

Bengt Bergstroem *In its* Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 7-13 refs (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

The integration of human factors in systems design and development is considered. The role of the ergonomist as an integral member of the design team is depicted. Real world limitations which sometimes prevent optimal systems from being realized are pointed out. These can be technical and economical, or political and legal constraints on design engineers. Limitations may also arise from the planning process or from scientific uncertainty as to the solvability of a problem. Common systems language and systems design criteria improve communication between specialists on the human side and on the hardware side. The identification of systems related tasks and functions has a direct influence on human performance in systems operation and determines their efficiency. Author (ESA)

N82-19841# Navy Personnel Research and Development Center, San Diego, Calif.

HUMAN FACTORS IN SYSTEM DEVELOPMENT: STATUS AND EVALUATION

David Meister *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 15-76 refs (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

Human factors in system development as it is presently performed in the U.S. is described. What is achieved and remaining problems are discussed, indicating research requirements and how human factors research does or does not satisfy these requirements. The way in which the developmental human factors engineer performs and the kinds of information needed are determined by circumstances under which the work is done. These circumstances make demands for supporting human factors research which to a large extent are not now being satisfied. As a consequence, the developmental human factors engineer's ability to perform system development tasks is severely impaired. Author (ESA)

N82-19842# Aktiebolaget Ergonomilaboratoriet, Stockholm (Sweden).

ERGONOMIC CONSIDERATIONS IN PRODUCT DESIGN AND EVALUATION

Toni Ivergaard *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 77-95 (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

The influence of free market competition, particularly advertising and marketing constraints, on product development is assessed. The need for an ecological approach is stressed while an ergonomic design procedure is outlined. The marketing of products which are offered to consumers, including industrial users, is in some respects good and fulfills useful functions for the consumers. Still, there are many products which are potentially dangerous, unhealthy, uncomfortable, wearing or difficult to use. Ergonomics in product evaluation can help identify these problems. In many countries, the authorities feel obliged to control development in different ways. The extent and direction of these controls depends on the companies themselves investing in ergonomics as part of product development. Author (ESA)

N82-19843# Ergonomaad A.B., Karlstad (Sweden).

HUMAN FACTORS AND SAFETY IN NUCLEAR POWER PLANT OPERATION

Jan Wirstad *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 97-122 refs (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

Taking the Three Mile Island accident as an example, the extent to which human factors engineering is accepted and implemented in nuclear power plant design and operation is discussed. Characteristics of process plant operator jobs are pointed out. The safety philosophy of a nuclear power plant is called into question. Human factors R and D in the U.S. and Europe are reviewed. The need to integrate human factors with plant planning, procurement and evaluation is evident.

Author (ESA)

N82-19844# Research Inst. of National Defence, Karlstad (Sweden).

WORK PARADIGMS IN HUMAN FACTORS RESEARCH

Hans Furustig *In its* Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 123-135 refs (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

Reasons for studying the systems development process from a behavioral standpoint are put forward. The complexity of factors influencing systems development is examined. Indications of irrational systems development are listed. The work paradigm is defined in terms of hardware factors, personnel factors, and procedures. Means of studying systems development are outlined, i.e., participation in systems development, historical documentation, and simulation. The results of such studies can be of significant assistance in optimizing the efficiency of the development process. Author (ESA)

N82-19845# Navy Personnel Research and Development Center, San Diego, Calif.

HUMAN FACTORS FOR THE FUTURE: TRENDS AND SPECULATIONS

David Meister *In* Research Inst. of National Defence Human Factors in System Develop.: Experiences and Trends Jun. 1981 p 137-155 refs (For primary document see N82-19839 10-54)

Avail: NTIS HC A08/MF A01

Two possible scenarios for human factors (HF) utilization in the next 20 years are projected. The worst case scenario is one of status quo; it suggests that no fundamental changes in HF research and practice will occur because of the continuing inability of the HF practitioner (the developmental human factors engineer) to apply research to systems development. The best case scenario assumes that the current gap between HF research and practice will be bridged and that consequently the developmental engineer's ability to analyze, evaluate and predict will be significantly increased. Author (ESA)

N82-19846# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Computer Science.

SAM: A CONFIGURABLE EXPERIMENTAL TEXT EDITOR FOR INVESTIGATING HUMAN FACTORS ISSUES IN TEXT PROCESSING AND UNDERSTANDING

Roger W. Ehrich Sep. 1981 38 p

(Contract N00014-81-K-0143)

(AD-A109331; CSIE-81-3) Avail: NTIS HC A03/MF A01 CSCL 09/2

There are numerous behavioral issues involving human-machine communications that are exemplified by text editing applications. Examples include scanning mechanisms and information location techniques, command language design, effect of language syntax on productivity and accuracy, and the relationship of syntax to the user task model. In general, there

exist little data to support design goals, and in order to formulate studies of these issues, a flexible text editing system is required. This report describes SAM, a reasonably sophisticated text editor that has table driven command language and syntax that allows reasonably easy reconfiguration for special experiments. In particular, it is straightforward to insert the metering procedures required to measure specific aspects of human performance.
Author (GRA)

N82-19847# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
TRANSMISSION OF SINUSOIDALLY CHANGING VERTICAL SPECIFIC FORCE TO THE HEADS OF SEATED MEN MEASURED IN A FLIGHT SIMULATOR
R. A. A. Reutlinger and J. C. vanderVaart May 1981 34 p refs
(VTH-LR-319) Avail: NTIS HC A03/MF A01

Modulus and phase lag of the transmission of vertical specific force between a flight simulator moving base and the heads of 10 male seated subjects were measured over a frequency range of 0.1 to 9 Hz. Subjects were seated unrestrained in a normal relaxed position in a pilot seat with or without seat cushions. Although there is scatter among subjects, prominent peaks at around 1.5, 6, and 10 Hz are found for the case without seat cushions. The presence of seat cushions tends to cause a single larger peak in the modulus at around 4 to 5 Hz, and a larger phase lag at higher frequencies. A modulus close to unity and no phase lag are found both with and without seat cushions at frequencies below 1 Hz. It is difficult to read cockpit instruments in the frequency range 4 to 8 Hz.
Author (ESA)

N82-19848# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Instrumentierung und Anthropotechnik.
INTERACTIONS BETWEEN HELMET MOUNTED SIGHT DISPLAY AND SENSOR PLATFORM UNDER THE INFLUENCE OF A HUMAN PILOT
Erhard Danneberg, Ernst Kohnen, Helmut Stein, and Ulrich Stolzke Jun. 1981 182 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-746)
(DFVLR-FB-81-30) Avail: NTIS HC A09/MF A01; DFVLR, Cologne DM 37.90

For low altitude flight of helicopters at night and with poor visibility, the interaction of a helmet mounted sight display (HMS/D), a moving sensor platform and a human pilot as system user was investigated by means of laboratory, moving simulator, and flight tests. The technical potential of the HMS/D in the laboratory, the tracking accuracy achieved by the pilot on the moving simulator, and the practical application under real flight conditions are considered. Considerable improvements are possible compared to head down displays if the layout of the instrument readings and their combination with an environmental picture are favorable.
Author (ESA)

N82-19147*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ENVIRONMENTAL CONTROL SYSTEMS
Frank Hrach *In* NASA. Langley Research Center Elec. Flight Systems Feb. 1982 p 247-252 (For primary document see N82-19134 10-01)
Avail: NTIS HC A12/MF A01 CSCL 06K

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N82-19849# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS SCIENTIFIC LABORATORY COMPUTER BENCHMARK PERFORMANCE 1979
Ann H. Hayes, Ingrid Y. Bucher, and Margery McCormick, ed. Feb. 1981 29 p refs
(Contract W-7405-eng-36)
(LA-8689-MS) Avail: NTIS HC A03/MF A01

Computers are benchmarked for performance evaluation and procurement purposes. Compile times, execution speeds, and comparison histograms are presented for a representative set of benchmark programs and the following computers: Cray-1; CDC 7600, CDC 6600 Cyber 73, Cyber 760, Cyber 750; Cyber 730, and Cyber 720; and IBM 370/195 and IBM 3033. S.L.

N82-19850# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROGRAMMABLE PRINTING TERMINAL M.S. Thesis [TERMINAL IMPRESSOR PROGRAMAVEL]
Luiz Carlos Perondini Corato May 1981 104 p refs In PORTUGUESE; ENGLISH summary
(INPE-2082-TDL/056) Avail: NTIS HC A06/MF A01

A functional model of a Programmable Printing Terminal is proposed in this work. This terminal utilizes an electric typewriter as a printer. Besides the common functions of programmable terminals, this model offers the capability of being configured as a 'terminal concentrator', as well as associated with a cassette-type mass memory. The hardware that implements the proposed model is described at a block diagram level. The operating functions, including a text editor, as well as the software structure that implements them, are described at fluxogram level. Some simulation processes intended to validate selected programming modules are presented. A critical evaluation of the model, as well as some considerations on the possible ways of upgrading it, are made.
Author

N82-19851# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PROGRAMMABLE PRINTING TERMINAL [TERMINAL IMPRESSOR PROGRAMAVEL]
Luiz Carlos Perondini Corato Jun. 1981 10 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Natl. Meeting on Automation, Salvador, Brazil, Jul. 1981
(INPE-2096-RPE/326) Avail: NTIS HC A02/MF A01

A programmable printing data terminal is described which utilizes an electric typewriter as a printer. An electromechanical set makes this conversion possible with no need for access to the mechanism of the typewriter. The electronic circuit is based on a microprocessor which controls the conversion set and implements the terminal functions. A text editor, adapted to the particularities of the typewriter, is part of the operational program of the terminal.
Author

N82-19852# Sterling Systems, Inc., Golden, Colo.
DATA INDEPENDENT ACCESSING METHODOLOGY DISTRIBUTED ACCESS Final Technical Report
Lowell I. Schneider and Michael Levin Griffiss AFB, N.Y. RADC

Jun. 1981 242 p refs
(Contract F30602-79-F-0054; AF Proj. 4594)
(AD-A108645; RADC-TR-81-137) Avail: NTIS HC A11/MF A01 CSCL 09/2

DIAM, The Data Independent Accessing Model, is a theory for describing the various ways in which information can be represented in a computer. This report uses a relational model of data to define the information resources of a collection of data archives, and the details of how it is stored to the extent necessary to extract it. Access begins by asking a question of the Relational Model (which cuts across sources in combination). The DIAM model then makes it possible to decompose the question into parts so small that no more than one source is needed to answer each part, translate each part to correspond to the representation used by the source, and recompose the translated parts into the largest possible pieces, each of which corresponds to a common source. These requests are then transmitted to the required sources and the returned information is decomposed and recomposed in precisely the opposite way that the question was, yielding the originally sought answer. The report concludes that it is now both feasible and justified to develop a prototype data base access compiler for experimental testing in existing networks. Author (GRA)

N82-19853# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.
OVERVIEW OF THE CHiP COMPUTER Interim Technical Report
Lawrence Snyder 19 Aug. 1981 13 p refs
(Contracts N00014-80-K-0816; N00014-80-K-0360; NR Proj. SRO-100)
(AD-A109293; CSD-TR-377) Avail: NTIS HC A02/MF A01 CSCL 09/2

The main question under study is how wide the corridor width should be for the switch lattice of the Configurable, Highly Parallel (CHiP) computer. (The CHiP computer family is introduced and its use for parallel algorithm composition is motivated.) It is argued on the basis asymptotic analysis that a constant corridor width is preferred even though such lattices cannot make full use of the processor elements for most complex interconnection patterns, e.g., universal interconnection structures like the cube connected cycles and shuffle exchange, and for certain 'simple' ones, e.g., certain planar graphs. Author (GRA)

N82-19854# Stanford Univ., Calif. Dept. of Computer Science.
NATURAL LANGUAGE ACCESS TO DATABASES: INTERPRETING UPDATE REQUESTS
Jim Davidson and S. Jerrold Kaplan 30 Sep. 1981 24 p refs
(Grant N00039-80-G-0132)
(AD-A109183) Avail: NTIS HC A02/MF A01 CSCL 09/2

For natural language database systems to operate effectively in practical domains, they must have the capabilities required by real applications. One such capability is understanding and performing update requests. The processing of natural language updates raises problems not encountered in the processing of queries. These difficulties stem from the fact that the user will naturally phrase requests with respect to his conception of the domain, which may be a considerable simplification of the actual underlying database structure. Updates which are meaningful and unambiguous from the user's standpoint may not translate into reasonable changes to the underlying database. Update requests may be impossible (cannot be performed in any way), ambiguous (can be performed in several ways), or pathological (can be performed only in ways which cause undesirable side effects). Drawing on work in Linguistics and Philosophy of Language, we have developed a domain-transparent approach to identifying and performing 'reasonable' changes in response to a user's update request, using only knowledge sources typically present in existing database systems. A simple notion of 'user model' and explanation with respect to the user's state of knowledge are central to the design. This paper describes a system PIQUE (Program for Interpreatation of Query/Update in English), which implements this approach. Author (GRA)

N82-19855# Measurement Concept Corp., Rome, N. Y.
INTELLIGENCE PROCESSOR PERFORMANCE ANALYSIS (IPPA) Final Technical Report, 29 Feb. 1980 - 31 Mar. 1981
Jim Cantrell, Roger Poland, and Jim Labout (Bunker-Ramo Corp.)
Griffiss AFB, N.Y. RADC Jul. 1981 240 p
(Contract F30602-80-C-0099; AF Proj. 4594)
(AD-A108794; RADC-TR-81-207) Avail: NTIS HC A11/MF A01 CSCL 15/4

This report has documented the functional design that was developed for an AN/GYQ-21(V) hardware monitor. The report provides a concept of monitoring to place the development of the hybrid monitor in its proper perspective. The report defines the measurement set the monitor will measure. The functional design includes both the software and hardware components with the rationale for their use to be able to monitor the measurement set selected. The software specifications include tasks such as coordination between the host processor and monitor, measurements, and measurement reporting. Foremost in the designer's mind has been the ease of user interface with the monitor. The hardware/specifications include such areas as packaging, power requirements, EMI/RFI emissions, Qualifier Logic, and special modules. The report includes a theory of operations that references the design and specifications and provides an insight into functional breakout by measurement requirements. Author (GRA)

N82-19856# Mitre Corp., Bedford, Mass.
TRUSTED COMPUTER SYSTEMS. GLOSSARY
George A. Huff Mar. 1981 24 p refs
(Contract F19628-81-C-0001; AF Proj. 8420)
(AD-A108829; MTR-8201) Avail: NTIS HC A02/MF A01 CSCL 09/2

A Trusted Computer System is a computer system that employs sufficient hardware and software integrity measures to allow its use for the simultaneous processing of multiple levels of classified or sensitive information. This glossary was prepared for distribution at the Third Computer Security Initiative Seminar held at the National Bureau of Standards, November 18-20, 1980. Emphasis is on terms which relate to the formal specification and verification of such systems. Author (GRA)

N82-19857# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
BEST AVAILABLE TECHNOLOGIES (BATS) FOR COMPUTER SECURITY Interim Report
Carl E. Landwehr 21 Dec. 1981 27 p refs
(RR0140941)
(AD-A109189; NRL-8554) Avail: NTIS HC A03/MF A01 CSCL 09/2

Over more than a decade, government, industry, and academic centers have invested substantial resources in techniques for developing secure computer systems. The major projects to develop such systems are surveyed from the perspective of a system developer about to undertake the design and implementation of a secure software system. Experience with specific techniques and applications is summarized, and recommendations are given. Suggested approaches to each phase of the system life cycle are provided. The principal recommendations to developers are that they consider the security requirements of each system as part of its functional requirements, rather than as a separate set of requirements; that they continue to think about security throughout the design and implementation of the system; and that they use the best available software engineering technology. Author (GRA)

N82-19858# Boeing Aerospace Co., Seattle, Wash.
SYNTACTIC VISUAL IMAGE GENERATION SYSTEM FEASIBILITY STUDY Final Technical Report, Jun. - Nov. 1981
Dec. 1981 28 p refs
(Contract MDA903-81-C-0332; ARPA Order 4278)
(AD-A109334) Avail: NTIS HC A03/MF A01 CSCL 09/2

During phase 1 of the Syntactic Visual Image Generation program; Boeing has investigated several methods of implementing a pipelined multiprocessor multimemory image generation system. Also, Boeing has assessed architectures for a fractal-object processor and has developed high level simulations to predict performance and architecture feasibility. Additionally, cost/

performance analysis and possible VLSI implementation of the various architectures have been assessed. GRA

N82-19859# Aeronautical Research Labs., Melbourne (Australia).
PRINTR: A TEXT AND GRAPH PLOTTING SYSTEM WITH EXPANDED CAPABILITIES
G. F. Forsyth Jul. 1981 14 p
(AD-A109045; ARL/AERO-TM-333) Avail: NTIS HC A02/MF A01 CSCL 09/2

A system for using control character sequences to extend a printer's character set and to more efficiently handle graph data and drawings has been written as a machine language program for the PDP8 computer with electrostatic plotter. Features added to text files include Greek and mathematical symbols, superscripts, two levels of subscripts and overstruck (superimposed) bars, dots and combined bars and dots. Plot files have two modes using 8 or 12 bit data words and may be either continuous scan or byte addressed. Plot and Text files may be mixed but not superimposed. Author (GRA)

N82-19860# JRS Industries, Inc., San Diego, Calif. Technical Services Div.
STUDY AND EXPERIMENTATION OF HORIZONTAL MICROPROCESSOR MACHINE DESCRIPTION TECHNIQUES Final Report, Apr. - Nov. 1981
John L. Gieser and Robert J. Sheraga 1 Nov. 1981 69 p refs
(Contract DAAG29-81-C-0018)
(AD-A109136; ARO-18012.1-S-EL) Avail: NTIS HC A04/MF A01 CSCL 09/2

This document reports on the research and investigation aspects of microarchitecture description methodologies. Its primary objectives are: (1) to identify the methodology that appears to have the most promise for use in an automatic microcode generation system; and (2) to define the means for developing the necessary tools and techniques needed for further evaluating this methodology. In automatically generating microcode from a high level source language, a significant issue is the description of the target microengine architecture. The techniques and methodologies used to accomplish this must address the practical issues of: (1) a detailed description of all microprogrammed controlled hardware elements of the microengine, the microinstruction, the rules for valid use of all microprogrammed features, and the behavior of microprogrammed operations; and (2) the use of this description to interpret and decode higher level source intermediate language to form microoperations and ultimately microinstructions. This work is a step in conceptually defining the techniques and methodologies for microarchitecture descriptions to accomplish the above. Author (GRA)

N82-19861# Virginia Polytechnic Inst. and State Univ., Blacksburg. Computer Science Industrial Engineering/Operations Res.
A TWO-DIMENSIONAL CORE GRAPHICS SYSTEM FOR RESEARCH IN HUMAN-COMPUTER INTERFACES
Roger W. Ehrich Oct. 1981 63 p
(Contract N00014-81-K-0143)
(AD-A109280; CSIE-81-4) Avail: NTIS HC A04/MF A01 CSCL 09/2

Graphics is an important requirement for human-computer communication, and in order to construct good interfaces and conduct behavioral experiments, a flexible and reliable package is required. Such a package must be extensible, and because of the dynamic nature of facilities, it must be quickly adaptable to new device types. This report describes a limited implementation of the ACM/SIGGRAPH Core System that will be the vehicle for the graphics aspects of the research program at Virginia Tech in human factors in computation. Author (GRA)

N82-19862# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
A REMOTE TERMINAL EMULATOR FOR PRIME COMPUTERS
Daniel H. Forsyth, Jr. Aug. 1981 34 p refs
(Contract N00014-79-C-0873; GIT Proj. G36-643)
(AD-A108818; GIT-ICS-81/12) Avail: NTIS HC A03/MF A01 CSCL 09/2

A remote terminal emulator is a device that emulates sources of on-line input to a computer system, and is one of the most reliable tools for measuring the performance of time-shared computer systems. The remote terminal emulator described in this report provides simultaneous emulation for a number of communication lines as well as the software necessary for the preparation of scripts (a sequence of actions to be performed by the emulator) the setup and control of test sessions, and the analysis of test results. Author (GRA)

N82-19863# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
INITIAL EXPERIENCE WITH A LOCAL NETWORK: NET/ONE BY UNGERMANN-BASS, INCORPORATED
Philip H. Enslow, Jr., Paul D. Manno, and Jeannette T. Myers 1 Oct. 1981 26 p refs
(Contracts N00014-79-C-0873; F30602-78-C-0120; GIT Proj. G36-643; GIT Proj. G36-649)
(AD-A108817; GIT-ICS-81/11) Avail: NTIS HC A03/MF A01 CSCL 09/2

Net/One, the local area network produced by Ungermann-Bass, has been installed and operated in the Georgia Tech Fully Distributed Processing System's (FDPS) testbed. Currently Net/One interfaces with Prime 400, Prime 550, and PDP 11/45 computers which are located in the computer lab and several different types and brands of ASCII, asynchronous terminals. This report includes a description of the design and operation of the various Net/One components, a discussion of the rationale for the selection of Net/One for installation in the FDPS testbed, our initial experiences with Net/One including problems encountered and their solutions, and concludes with a description of the plans for future enhancements to its operation. Author (GRA)

N82-19864# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
PERFORMANCE OF DISTRIBUTED AND DECENTRALIZED CONTROL MODELS FOR FULLY DISTRIBUTED PROCESSING SYSTEMS. INITIAL SIMULATION STUDIES Final Technical Report, 1 Jul. 1980 - 30 Jun. 1981
Phillip H. Enslow, Jr. and Timothy G. Saponas Jul. 1981 103 p refs
(Contract F30602-78-C-0120; GIT Proj. G36-654)
(AD-A108974; GIT-ICS-81/09) Avail: NTIS HC A06/MF A01 CSCL 09/2

An essential component of a Fully Distributed Processing System (FDPS) is the distributed and decentralized control. This component unifies the management of the resources of the FDPS and provides system transparency to the user. In a previous study, the problems of distributed and decentralized control were analyzed resulting in the specification of several control models. This study continues that work by further specifying the control models defined in the first report and comparing the performance of these models in various environments. This performance analysis is accomplished by means of simulation experiments. The results of the experiments indicate that the control message traffic generated by the distributed and decentralized control is much less than expected and probably does not present a barrier to the implementation of FDPSs. Comparison of the results of the simulation of a uniprocessor and that of an FDPS indicate that little or no loss of performance is experienced by the FDPS. An important limitation of these initial performance studies is the fact that user traffic is not included in this series of tests. Author (GRA)

N82-19865# Harvard Univ., Cambridge, Mass. Computation Lab.
ON THE POWER OF PROBABILISTIC CHOICE IN SYNCHRONOUS PARALLEL COMPUTATIONS
John H. Reif Nov. 1981 32 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109047; TR-30-81) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper introduces probabilistic choice to synchronous parallel machine models; in particular parallel RAMs. The power of probabilistic choice in parallel computations is illustrated by O(log n) time algorithms for connectivity and recognizing bipartite graphs and O(log n) squared time algorithms for testing if a graph has a perfect matching, testing in time O(n)

irreducibility of polynomials over finite fields. We characterize the computational complexity of time, space, and processor bounded probabilistic sequential RAMs. We show that parallelism uniformly speeds up time bounded probabilistic, sequential RAM computations by nearly a quadratic factor. We also show that probabilistic choice can be eliminated from parallel computations by introducing nonuniformity. Author (GRA)

N82-19866# Stanford Univ., Calif. Dept. of Computer Sciences.
SYNTHESIS OF COMMUNICATING PROCESSES FROM TEMPORAL LOGIC SPECIFICATIONS
Zohar Manna (The Wiezmann Inst., Rehovoth, Israel) and Pierre Wolper Sep. 1981 29 p refs Presented at the Workshop on Logics of Programs, Yorktown-Heights, N.Y., 1981
(Contract N00014-76-C-0687; Grants AF-AFOSR-0014-81; NSF MCS-80-06930)
(AD-A109853; SU-STAN-CS-81-872) Avail: NTIS HC A03/MF A01 CSCL 09/2

In this paper, we apply Propositional Temporal Logic (PTL) to the specification and synthesis of the synchronization part of communicating processes. To specify a process, we give a PTL formula that describes its sequence of communications. The synthesis is done by constructing a model of the given specifications using a tableau-like satisfiability algorithm for PTL. This model can then be interpreted as a program. Author (GRA)

N82-19867# Research Inst. of National Defence, Linkoeping (Sweden).
DATA COMMUNICATION FOR MINICOMPUTERS [DATA KOMMUNIKATION FOER SMAADATORER]
Rolf Mellberg Aug. 1981 64 p refs In SWEDISH
(FOA-C-30226-E2) Avail: NTIS HC A04/MF A01

Data communication problems posed by the increasing use of minicomputers are discussed. A standard network is needed in order to overcome difficulties arising from the geographical dispersion of these computers. Program files based on existing techniques are adapted to minicomputers. Ways in which data processing terminals of larger computers can be linked to minicomputers are discussed. Author (ESA)

N82-19868# Horray K.G., Furtwangen (West Germany).
MICROPROCESSOR CONTROLLED STAMPING UNIT WITH NEEDLE PRINTER Final Report, Dec. 1980
Klaus Ruppert Klein Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 50 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-189; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

The development of the Horray KG CS80 Computer Stamp was developed. A duty file in which all important functions are defined was worked out. The mechanical boundary conditions were determined and a mechanical prototype was constructed. The electromechanical device was built to permit printing tests. The computer system 8085, is composed of several boards containing power supply, power amplifier and display. These modules are, mounted on one board. Matching software is written in ASSEMBLER. Author (ESA)

N82-19869# Polytec Gesellschaft fuer Mess- und Regeltechnik m.b.H. und Co., Waldbronn (West Germany).
MICROPROCESSOR AIDED CONTROL AND SIGNAL PROCESSING SYSTEM FOR A LASER-TWO-FOCUS VELOCIMETER IN TURBOMACHINERY RESEARCH Final Report, Sep. 1980
Helmut Selbach Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-190; ISSN-340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,90

A control and signal processing system for a time of flight velocimeter for measurement of velocity and turbulence in the rotating components of turbomachinery and for other applications was developed. The signal processor is based on pulse air timing techniques and multichannel analysis. An electronic shaft angle encoder measures the velocity distributions at up to 16 positions between successive rotor blades by tagging each time interval measurement with the proper angular position of the blade rows. The control functions are carried out by microprocessors. Author (ESA)

N82-19870# Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
FAST PROCESSOR FOR SPECTRAL ANALYSIS (ORAS)
P. Gilles Aug. 1981 21 p Presented at 20th URSI General Assembly on Telecomunications and Digital Signal Processing, Washington, D.C., 11 Aug. 1981
(CRPE-NT-106) Avail: NTIS HC A02/MF A01

A digital peripheral for a minicomputer, microprogrammed and macroprogrammable, dedicated to geophysical measurements signal analysis is presented. Processing capabilities include linear/vectorial functions, real/complex functions, and auto/cross spectra of an adjustable number of channels. The ORAS gives a HP 1000 F computer the capability of quickly calculating and integrating the spectral matrices of VLF satellite data with nine, or fewer, components. The complex Fourier transform with summation takes 20 msec for 1024 samples. The computer software controls the sequence of operations and the data transfers up to 1 M w/sec. Author (ESA)

N82-20123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPROVING THE COMPUTER-HUMAN INTERFACE: THE QUALITATIVE MONITOR DISPLAY
H. W. Baugh and A. I. Zygielbaum *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 66-69 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09B

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-19871 Virginia Polytechnic Inst. and State Univ., Blacksburg.
COMPUTATIONALLY FAST ALGORITHMS FOR ARMA SPECTRAL ESTIMATION Ph.D. Thesis
Koji Ogino 1981 187 p
Avail: Univ. Microfilms Order No. 8126278

The high performance method for obtaining an ARMA model spectral estimate of a wide-sense stationary time series was found to provide typically superior performance when compared to such contemporary approaches as the Box-Jenkins and maximum entropy methods. Fast recursive algorithmic implementations of the high performance method are developed. They are recursive in the sense that as a new element of the time series is observed, the parameters characterizing an ARMA spectral estimate are algorithmically updated. The number of multiplications and additions required at each recursive stage are of the order p with p being the number of denominator coefficients of the ARMA model. Methods of modification of the data are applied to achieve a significant computational improvement. The development is predicated on utilization of various projection operators. Dissert. Abstr.

N82-19872# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ANALYSIS OF THE ILLUMINATION OF AREAS COVERED BY A SATELLITE IN A HELIOSYNCHRONOUS CIRCULAR ORBIT [ANALISE DE ILUMINACAO DAS AREAS COBERTAS PORUM SATELITE DE ORBITA HELIO-SINCRONA CIRCULAR]
Valder Matos deMedeiros Aug. 1981 59 p refs In PORTUGUESE; ENGLISH summary
(INPE-2208-RPE/398) Avail: NTIS HC A04/MF A01

A FORTRAN 4 program is described which provides information concerning the sunlighting conditions on the subsatellite point required for sensor dimensioning. Some

examples are given to illustrate the interpretation of results.
M.G.

N82-19873# Los Alamos Scientific Lab., N. Mex.
COVFILS: A 30-GROUP COVARIANCE LIBRARY BASED ON ENDF/B-V
D. W. Muir and R. J. Labauve Mar. 1981 166 p refs
(Contract W-7405-eng-36)
(LA-8733-MS) Avail: NTIS HC A08/MF A01

A library of 30-group cross sections and covariances called COVFILS was prepared from Evaluated Nuclear Data File/B-V data using the NJOY code system. The library includes data on the total cross sections, scattering cross sections, and the most important absorption cross sections for H, B, C, O, Cr, Fe, Ni, Cu, and Pb. Detailed descriptions of various features of the library, a listing of a FORTRAN retrieval program, and 143 plots of the multigroup cross section uncertainties and their correlations are given.
M.G.

N82-19874# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DISTRIBUTION OF PERSONNEL, VEHICLES, AND SUPPLIES BY SHIP: A MODEL APPLIED TO THE BRAZILIAN NAVY M.S. Thesis [DISTRIBUICAO DE PESSOAL, VIATURAS E SUPRIMENTOS POR NOVIOS: UM MODELO APLICADO AO CASO DA MARINHA BRASILEIRA]
Sergio Martins Vianna Jan. 1982 107 p refs In PORTUGUESE; ENGLISH summary
(INPE-2305-TDL/073) Avail: NTIS HC A06/MF A01

The development of a mathematical algorithm together with a data processing system, in the area of linear programming is studied with the purpose of finding several alternatives related to the demands of maritime transportation. The modeling of the theory used for the solution of transportation problems is presented, emphasizing the decomposition technique idealized by Dantzig-Wolfe. The mathematical selected (Mathematical Programming System), is discussed. Finally, a practical application of a typical problem related to Navy operations is presented, generating a model whose data approximate the reality within the dimensions of naval problems encountered. A short discussion of the theme presented, together with a synopsis of suggestions that may influence future studies and developments of the topic are presented.
R.J.F.

N82-19875# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ALGOL-MS, A LANGUAGE FOR THE DEVELOPMENT OF MULTIPROGRAMMED SMALL SYSTEMS M.S. Thesis [ALGOL-MS UMA LINGUAGEM PARA O DESENVOLVIMENTO DE SISTEMAS MULTIPROGRAMADOS DE PEQUENO PORTE]
Ubirajara Moura deFreitas Dec. 1981 115 p refs In PORTUGUESE; ENGLISH summary
(INPE-2282-TDL/067) Avail: NTIS HC A06/MF A01

A high level language, called ALGOL-MS, tailored to multiprogramming of small computers is developed. The language uses a set of primitives, that constitutes the system Kernel. The Kernel and a cross-compiler which generates machine code to the INTEL 8080 microcomputer are developed. During compilation, the Kernel code is included on the generated code.
Author

N82-19876# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A SYSTEM FOR IMPLANTATION OF DATA BANKS IN BURROUGHS SERIES B7000/B6000 COMPUTERS M.S. Thesis [UM SISTEMA PARA A IMPLANTACAO DE BANCOS DE DADOS RELACIONAIS NOS COMPUTADORES BURROUGHS DAS SERIES B7000/B6000]
Jose Oscar Machado Alexandre and Paulo Cesar Pereira Guerra Jan. 1982 95 p refs In PORTUGUESE; ENGLISH summary
(INPE-2299-TDL/070) Avail: NTIS HC A05/MF A01

The relational system designed for Burroughs' machines (series B7000/B6000) is introduced. The relational system was conceived to implement multipurpose relational data bases in the Burroughs' environment using the dbms software package, DMS-II, as a support tool. It offers the users a high level non-procedural query language, called SEQUEL2/Q5, and usual procedural languages as COBOL, ALGOL, and PL/1.
Author

N82-19877# Delaware Univ., Newark. Dept. of Computer and Information Sciences.
PRACTICAL ISSUES IN HAVING A USABLE LIBRARY OF SOFTWARE SPECIFICATIONS Interim Technical Report
Ralph M. Weischedel Mar. 1981 40 p refs
(Contract F49620-79-C-0131; Grants AF-AFOSR-3539-78; AF-AFOSR-0190-80; AF Proj. 2304)
(AD-A108656; AFOSR-81-0799TR) Avail: NTIS HC A03/MF A01 CSCL 09/2

Though formal specifications of software modules offer much toward the design problems of large software systems, creating formal specifications is very difficult, requiring much upfront effort. This paper examines a common idea for dealing with the high cost of software, but in the context of specification. That idea is a pool or 'library' of specifications, so that it is easy to build on the work of others. Unlike other efforts that have concentrated on technical problems in having such a library, this paper identifies and studies several common sense requirements on such a library being effectively used. Such issues are closer related to human factors than to technical problems; yet these are clearly as critical in use as technical issues. Our conclusions have arisen from two studies. In one, we wrote several module specifications in the form that might appear in a library. The module varied in complexity from a stack to the kernel of a text editor; the text editor specifications ranged in length from 9 to 28 pages including copious comments as in-line documentation. The second study compared portions of the English and formal specifications of KSOS (Ford Aerospace, 1978), the Kernelized Secure Operating System. The paper may be viewed as rather tutorial about writing correct, understandable formal specifications for others to use in their system design.
GRA

N82-19878# Delaware Univ., Newark. Dept. of Computer and Information Science.
PREREQUISITES TO DERIVING FORMAL SPECIFICATIONS FROM NATURAL LANGUAGE REQUIREMENTS Final Report, 1 Jul. 1980 - 31 Aug. 1981
Ralph M. Weischedel Oct. 1981 21 p refs
(Grant AF-AFOSR-0190-80; AF Proj. 2304)
(AD-A108612; AFOSR-81-0798TR) Avail: NTIS HC A02/MF A01 CSCL 05/2

Since English specifications and formal specifications of modules are complementary and since formal specifications require so much effort to write, our work is investigating application of artificial intelligence techniques to aid in the software specification process. The first area studied is comparing English descriptions with formal specifications of the same software module. This work is now complete; however, some of the examples will continue to serve as a guide to the software tool being constructed. The second area is suggesting modifications to formal specification languages, which would make them more understandable. In particular, we have been suggesting alternatives to logical quantifiers. The third and fourth areas deal with the syntactic and semantic components of an experimental software tool. Its purpose is to test our solutions to a handful of problems in transforming English descriptions to formal specifications under significant user assistance. In dealing with syntactic ambiguity, one of the solutions that many have spectulated about is the use of a semantic component to reject anomolous parses; we intend to test its effectiveness using the RUS grammar. When ambiguity is not resolved, questions must be presented to the user for his/her selection of the intended interpretation. Partial heuristics for this are part of the results of this year's effort. In addition, modification of the RUS parser and dictionary for the domain of software specification will continue during the next year.
GRA

N82-19879# Mitre Corp., Bedford, Mass.
THE SOFTWARE ACQUISITION RESOURCE EXPENDITURE (SARE) METHODOLOGY, DATA REQUIREMENTS AND DATA UTILIZATION
W. E. Byrne 7 Oct. 1981 20 p Presented at the 16th Ann. DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109372) Avail: NTIS HC A02/MF A01 CSCL 09/2

SARE reporting is a data collection methodology used to collect software-unique financial data plus technical data that make the financial data meaningful. The data can be used to monitor the progress of software development work on the

contract in which the data is collected. Also, the data is to be submitted to a multiproject Air Force Systems Command (AFSC) software data base. The data base will help formulate, calibrate, and validate software cost/schedule estimation methods. GRA

N82-19880# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

METAPHOR: AN INESCAPABLE PHENOMENON IN NATURAL LANGUAGE COMPREHENSION Interim Report

Jaime G. Carbonell 4 May 1981 25 p refs
(Contracts N00014-79-C-0661; F33615-78-C-1551; ARPA Order 3597)
(AD-A109026; CMU-CS-81-115) Avail: NTIS HC A02/MF A01 CSCL 09/2

Interpreting metaphors is an integral and inescapable process in human understanding of natural language. This paper discusses a method of analyzing metaphors based on the existence of a small number of generalized metaphor mappings. Each generalized metaphor contains a recognition network, a basic mapping, additional transfer mappings, and an implicit intention component. It is argued that this method reduces metaphor interpretation from a reconstruction to a recognition task. Steps towards automating certain aspects of language learning are also discussed. Part II analyzes analogical mappings underlying metaphors and implications for inference and memory organization. Regularities have been observed indicating that certain types of conceptual relations are much more apt to remain invariant in analogical mappings than other relations, resulting in an induced invariance hierarchy. The central thesis is that human inference processes are governed by the same analogical mappings manifest as metaphors in language. GRA

N82-19881# Coastal Engineering Research Center, Fort Belvoir, Va.

PRODUCTS FROM TWO COMPUTER PROGRAMS WHICH PROCESS DIGITAL BATHYMETRIC DATA

Barry E. Herchenroder Oct. 1981 17 p refs
(AD-A108757; CERC-CETA-81-13) Avail: NTIS HC A02/MF A01 CSCL 08/10

A description is given of products from two computer programs which process digital bathymetric data. One program generates regularly spaced bathymetric data from irregularly spaced data. The other uses regularly spaced data to determine and draw contours. A large set of irregularly spaced bathymetric data available on magnetic tape for U.S. coastal regions is also described. Examples of output from each program are displayed for two coastal areas. Author (GRA)

N82-19882# SRI International Corp., Menlo Park, Calif. Computer Science Lab.

TECHNIQUES FOR AUTOMATIC DEDUCTION Final Report, Jul. 1979 - Jul. 1981

Robert E. Shostak, P. Michael Melliar-Smith, and Richard L. Schwartz Oct. 1981 106 p
(Contract F49620-79-C-0099; SRI Proj. 8752; AF Proj. 2304)
(AD-A108979; AFOSR-81-0853TR) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report covers progress on a 2-year research effort toward the development of new theorem-proving methods for program verification, and the empirical investigation of these methods in actual verification systems. The research conducted during the course of the project focused on methods for simplifying formulas of the kind that arise frequently in the verification of programs. The importance of simplification methods, as opposed to pure proof methods, was pointed up by verification work conducted under a previous AFOSR contract. Perhaps the most significant outcome of the project is the development of an experimental theorem prover that has been used extensively in the proof of correctness of the design of a fault-tolerant operating system developed under NASA support. We believe that the technology embodied in this experimental system could be successfully applied to the development of a production verification system. Author (GRA)

N82-19883# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

GPRINT: A LISP PRETTY PRINTER PROVIDING EXTENSIVE USER FORMAT-CONTROL MECHANISM

Richard C. Waters Oct. 1981 23 p refs
(Contracts N00014-80-C-0505; N00014-75-C-0643)
(AD-A109031; AI-M-611) Avail: NTIS HC A02/MF A01 CSCL 09/2

A pretty printer is presented which makes it easy for a user to control the format of the output produced. The printer can be used as a general mechanism for printing, data structures as well as programs. It is divided into two parts: a set of formatting functions, and an output routine. Each formatting function creates a sequence of directions which specify how an object is to be formatted if it can fit on one line and how it is to be formatted if it must be broken up across multiple lines. Based on the line length available, the output routines decides what structures have to be broken up across multiple lines and produces the actual output following the directions created by the formatting functions. The directions passed from the formatting functions to the output routine form a well defined interface: a language for specifying formatting options. Three levels of user format-control are provided. A simple template mechanism makes it easy for a user to control certain aspects of the format produced. A user can exercise much more complete control over how a particular type of object is formatted by writing a special formatting function for it. He can make global changes in format by modifying the formatting process as a whole. Author (GRA)

N82-19884# Naval Postgraduate School, Monterey, Calif.

AN EVALUATION OF ESTIMATORS FOR RECEIVER DETECTION PROHABILITIES AND UNKNOWN SIGNAL POPULATION SIZE M.S. Thesis

David Scott Hendrickx Sep. 1981 70 p refs
(AD-A109536) Avail: NTIS HC A04/MF A01 CSCL 12/1

Imagine a signal acquisition system composed of a number of receivers or sensors concurrently scanning the same domain for signals. It is reasonable to expect that different signals will each be detected by a different subset of receivers over the scanning period. Using the data collected from the receivers, it is possible to estimate the total signal population size including those signals not detected by any receiver. Additionally, it is possible to estimate the probability each individual receiver detects signals. Several estimators are developed for these quantities in the context of a model designed to represent the signal detection process. This model forms the basis for a simulation conducted to analyze the behavior of the estimators over a variety of conditions. Author (GRA)

N82-19885# Loughborough Univ. of Technology (England). Dept. of Mathematics.

THE USE OF A NONQUADRATIC MODEL IN A CONJUGATE GRADIENT METHOD OF OPTIMIZATION WITH INEXACT LINE SEARCHES

A. Tassopoulos and C. Storey May 1981 19 p refs
(MATHS-Res-157) Avail: NTIS HC A02/MF A01

Conjugate gradient methods in optimization were studied. The traditional search method exhibits finite termination when applied to quadratic problems if exact line searches are used. The use of these, however, can cause excessive computational effort and consequently conjugate gradient methods, using inexact line searches, are suggested. Using a rational model (nonquadratic), different standard test functions were tried in various dimensions in order to examine the effectiveness of three methods: (1) function minimization by conjugate gradients, i.e., standard method; (2) conjugate gradient optimization method invariant to nonlinear scaling; and (3) conjugate direction method. Numerical results show the performance of the three methods, tested on a variety of updating formulas for the search directions and line search accuracy parameters. Author (ESA)

N82-19886# Analytical and Computational Mathematics, Zurich (Switzerland).

STUDY ON THE EXTENSION OF THE STROBOSCOPIC METHOD TO THE SECOND ORDER

J.-P. Halbritter Paris ESA Apr. 1981 147 p refs
(Contract ESOC-3856/79/D-JS(SC))
(ESA-CR(P)-1488) Avail: NTIS HC A07/MF A01

The second order effects of the second coefficient considered in gravity field expansion of planets in zonal spherical harmonics (J2) are calculated by an algebraic processor which

exploits the structure of the one revolution solution. The stroboscopic method is outlined. Computer programs are given. Sample runs show the expected increase in accuracy. Results for one revolution are given for two inclinations and eccentricities from 0.1 to 0.9. The method is applied to long-term evolution over 1000 revolutions. The graphs show no deterioration of accuracy compared with precise stable numerical integration of the orbital elements. The processor can handle other perturbations after minor modifications. Author (ESA)

N82-19887# Research Inst. of National Defence, Stockholm (Sweden). Huvudavdelning 2.

COMPARISON OF SOME IRREGULAR METHODS FOR LEVEL PLOTTING INTERPOLATION [JAEMFOERELSE MELLAN NAAGRA IRREGULJAERA INTERPOLATIONS-METODER FOER NIVAAPLOTTNING]

Anders Widman Nov. 1981 114 p refs In SWEDISH
(FOA-C-20433-D8) Avail: NTIS HC A06/MF A01

Four plotting interpolation methods are compared with regard to performance speed, standard deviation and image quality: Akima's irregular method, Nielson-Frankes method, quadratic Shephard, and thin plate splines. Akima's irregular method appears to be the fastest, but gives lowest image quality. Quadratic Shephard and thin plate splines give the best images. Marlow-Powell's regular method from the Harwell Subroutine Library is discussed. Other methods require a subroutine for level curves generation from regularly given data. In all cases the graphic package GPGS-F and its extensions GRAPHISTO and SURRENDER are applied for the graphic output. Author (ESA)

N82-19888# Research Inst. of National Defence, Linkoeping (Sweden).

IMIO: A ROUTINE LIBRARY FOR IMAGE INPUT/OUTPUT FILES ON DEC-10. DIRECTIONS FOR USE [IMIO - ETT RUTINBIBLIOTEK FOER BILDFILS-I/O PAA DEC-10. ANVAENDARHANDLEDNING]

Gunilla Loennemark Sep. 1981 116 p In SWEDISH
(FOA-C-30228-E1) Avail: NTIS HC A06/MF A01

A subroutine library which facilitates disk and tape storage of matrix form data is presented. The subroutines are written in MACRO 10 and are compatible with FORTRAN, PASCAL and SIMULA programs. Using appropriate coordinates, a rectangular sample of the image can be selected for processing.
Author (ESA)

N82-19889# Stuttgart Univ. (West Germany). Abt. Datenverarbeitung und Numerik.

ARITHMETIC MANIPULATION OF VARIABLES AND DATA BASE CONTENTS BY A SIMPLE DIALOG ORIENTED LANGUAGE WITH STRUCTURED ELEMENTS [ARITHMETISCHE MANIPULATION VON VARIABLEN UND DATENBANKINHALTEN DURCH EINE EINFACH DIALOGORIENTIERTE SPRACHE MIT STRUCTURIERERTEN ELEMENTEN]

Isabel Loebich Dec. 1979 122 p refs In GERMAN; ENGLISH summary
(IKE-4-104; ISSN-0173-6892) Avail: NTIS HC A06/MF A01

A module (ARS) was developed for the manipulation of global variables and data base contents, using arithmetic expressions formulated in a dialog language which can be interpreted immediately. The expressions are structured so as to allow bracketing and calling for in ARS defined functions. The structure elements, IF THEN ELSE, and WHILE DO are used for program control. Functional units such as parsing or table management are also included. A comparison with higher programming languages is made and examples where usage of ARS is particularly indicated are given. The modular structure allows application of subunits of ARS in other programs and enhances its versatility. Author (ESA)

N82-19890# Sheffield Univ. (England). Dept. of Control Engineering.

PSICON: A SIMULATION PACKAGE FOR THE DESIGN OF DIGITALLY CONTROLLED SYSTEMS

D. A. Linkens, L. S. Gray, M. Menad, and N. Mort (Royal Naval Engineering College) Oct. 1981 29 p refs
(RR-162) Avail: NTIS HC A03/MF A01

A simulation language based on a block oriented continuous systems simulator (PSI) is described. Using the message transfer capability of the multitasking operating system of a minicomputer, external digital control algorithms can be developed rapidly in FORTRAN, while retaining the advantages of a flow chart based and precompiled structure of the continuous simulation language. The use of the package is illustrated by (1) an anesthetics problem where time delay dynamics are controlled, using an external FORTRAN program comprising a Smith predictor plus a PID regulator; and (2) a self tuning adaptive autopilot for ship steering. The package gives fast simulation and good interactive properties, with the external controller segments giving the required flexibility for a wide range of uses. Author (ESA)

N82-19891# Imperial Coll. of Science and Technology, London (England). Dept. of Aeronautics.

IMPROVEMENTS OF THE ALGORITHMS USED FOR MONTE-CARLO DIRECT SIMULATION COMPUTATIONS

M. N. Macrossan Oct. 1981 20 p refs
(Contract AT/2037/084; Grant SRC-GR/B/67025)
(IC-Aero-81-03) Avail: NTIS HC A02/MF A01

Errors arising from the searching scheme used in the Monte Carlo direct simulation of gas flow program are identified. The calculation of cell volumes is clarified and the errors in using the four point searching scheme are examined. An error which results in the smearing of local surface coefficients and another which reduces these coefficients near the axis of the flow are overcome by a procedure which checks surface collisions. A plotting program produces a drawing of the cell boundaries from the Monte Carlo program input data in order to verify the arrangement of cells in the flow field. For a curved body surface, surface segment length is varied gradually. The requirements that cell sizes and time interval be small reduce errors.
Author (ESA)

N82-19892# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Regelung.

SIMULATION OF LINEAR MULTI-INPUT/MULTI-OUTPUT SYSTEMS BY PIECEWISE CONTINUOUS INPUT FUNCTIONS AND VARIOUS OPTIONS FOR THE GRAPHICAL REPRESENTATION OF RESULTS

Josef Petry Sep. 1981 129 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-749)
(DFVLR-Mitt-81-23) Avail: NTIS HC A07/MF A01; DFVLR, Cologne DM 27

A FORTRAN program for the simulation of linear continuous systems with multiple inputs and outputs is presented for regulation analysis. The input functions should be treatable as trajectories of ordinary homogeneous linear differential equation systems with constant coefficients. The program flow chart is discussed with emphasis on the initialization phase and the integration over the successive continuity intervals. Subprograms are provided for numerical or graphical presentation of the computed trajectories. The implementation and usage of the program is illustrated in several examples. Author (ESA)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-19893# Purdue Univ., Lafayette, Ind. Dept. of Computer Sciences.

PROGRAMMING PROCESSOR INTERCONNECTION STRUCTURES Interim Technical Report

Lawrence Snyder Oct. 1981 28 p refs
(Contracts N0001480-K-0816; N00014-80-K-0360; Proj. Blue CHiP)
(AD-A109294; CSD-TR-381) Avail: NTIS HC A03/MF A01
CSCL 09/2

Parallel computer architecture complicates the already difficult task of parallel programming in many ways, e.g., by a rigid interconnection structure, addressing complexity, and the shape and size mismatches. The CHiP computer is a new architecture that reduces these complications by permitting the processor interconnection structure to be programmed. This new kind of

programming is explained. Algorithms are presented for several interconnection patterns including the torus and the complete binary tree and general embedding strategies are identified.
Author (GRA)

N82-19894# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEVELOPMENT OF A COMPUTER CONSULTING SYSTEM USING DECISION RULES [DESENVOLVIMENTO DE UM SISTEMA DE CONSULTA, USANDO REGRAS OF DEC-ISAO]
Edson Luiz Franca Senne and Paulo Ouvera Simoni Jan. 1982 26 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2296-PRE/068) Avail: NTIS HC A03/MF A01

A computer consultation system is developed using artificial intelligence techniques and decision rules as a means for knowledge representation. The system consists of three main subsystems: the rule acquisition system, the diagnosis system, and the explanation system. The knowledge acquisition subsystem was designed as an interactive program in order to simplify the task of transferring knowledge to the system. This process occurs in two levels: enlarging or modifying the knowledge bank introducing new decision rules or changing existing ones; and acquiring new primitive concepts with which the rules are built up. The independence between the acquisition mechanism and the knowledge domain was given special consideration during the acquisition system design phase. Details are given on the acquisition system implementation, as well as on the diagnosis and explanation systems data structures. S.L.

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support*.

N82-19895# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STRUCTURAL PATTERN RECOGNITION [RECONHECIMENTO ESTRUCTURAL DE PADROES]
Flavio Roberto Dias Velasco Jun. 1981 23 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Ann. Meeting of SBPC, Salvador-Bahia, Brazil, Jul. 1981 and the 13th Brazilian Math. Colloq., Pocos de Caldas, Brazil, Jul. 1981
(INPE-2098-RPE/328) Avail: NTIS HC A02/MF A01

Some aspects of the structural approach to pattern recognition are presented. Particularly, the syntactic method and the filtering/relaxation method are emphasized. R.J.F.

N82-19896# Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, Md.
PROCEEDINGS OF THE 3RD MEETING OF THE COORDINATING GROUP ON MODERN CONTROL THEORY, PART 1
Herbert E. Cohen Nov. 1981 297 p refs Conf. held at Redstone Arsenal, Ala., 20-21 Oct. 1981
(DA Proj. 1R6-65706-M-541)
(AD-A109124) Avail: NTIS HC A13/MF A01 CSCL 15/3

Contents: Analysis of Tank Fire Control Systems by Optimal Control Theory; General Structure Discrete-Time Observers; On the Design of Predictors for Fire Control Systems; Microprocessor Implementation of an Adaptive Second Order Tracking/Prediction Algorithm for Tank Fire Control; On the Credibility of Models; A Linear Nonlinear Control Problem; Application of Modern Estimation and Control Techniques to the Glaads Test Vehicle; On Designing Robust Predictors Using Finite State Markov Chains; Robust Kalman Filtering; A Case Study of Modern Direct Digital Autopilot Design; Robust Missile Guidance; A New Class of Guidance Laws for Air-to-Air Missiles; Estimating Time-to-Go for use in Advanced Guidance Laws; Microprocessor-Based Optimal Controllers for a Helicopter Turret Control System; Discrete-Time Disturbance-Accommodating Control Theory; The Disturbance-Utilization Mode; Discrete Controller Design for Gaussian and Waveform Type Disturbances; and Stability Control of Large Inertia, Dynamical, Nonlinear Systems in the Presence of Unstabilizing Disturbances. GRA

N82-19897# Stanford Univ., Calif. Dept. of Computer Science.
GOOD LAYOUTS FOR PATTERN RECOGNIZERS
Howard W. Trickey Aug. 1981 16 p refs
(Contract MDA903-80-C-0107; Grant NSF MCS-80-12907)
(AD-A109324; SU-STAN-CS-81-871) Avail: NTIS HC A02/MF A01 CSCL 09/2

A system to lay out custom circuits that recognize regular languages can be a useful VLSI design automation tool. This paper describes the algorithms used in an implementation of a regular expression compiler. Layouts that use a network of programmable logic arrays (PLA's) have smaller areas than those of some other methods, but there are the problems of partitioning the circuit and then placing the individual PLA's. Regular expressions have a structure which allows a novel solution to these problems: dynamic programming can be used to find layouts which are in some sense optimal. Various search pruning heuristics have been used to increase the speed of the compiler, and the experience with these is reported in the conclusions.
Author (GRA)

N82-19898# Sheffield Univ. (England). Dept. of Control Engineering.
A MULTIVARIABLE FEEDBACK CONTROL PROBLEM WITH APPLICATION TO STRIP BASE CONTROL FOR SENDZIMIR MILLS
D. H. Owens Jul. 1981 14 p refs
(RR-153) Avail: NTIS HC A02/MF A01

The design of feedback controllers for a plant with transfer function matrix G(s)=diag [g sub i(s)]G sub m, where G sub m is a square and constant matrix and g sub i(s) is a scalar transfer function, 1< or = i < or = m is considered. The case when g sub i(s) = g(s), 1< or = i < or = m, and G sub m is singular or almost singular is emphasized. The robustness of the design with respect to errors in G sub m is represented in terms of a system of strict inequalities. This case is amenable to analysis in the standard, nonstandard and robustness sense.
Author (ESA)

N82-19899# Sheffield Univ. (England). Dept. of Control Engineering.
THE RECEDING HORIZON PRINCIPLE FOR DISTRIBUTED SYSTEMS
S. P. Banks Dec. 1981 26 p refs Presented at J. Franklin Inst. Conf. on Control of Distributed Systems, Penn.
(RR-167) Avail: NTIS HC A03/MF A01

A nonlinear control law which improves on the classical linear quadratic solution is obtained by generalizing the receding horizon principle to wave and diffusion type distributed parameter systems. If the system operator (A or B) generates a group, the generalization is straightforward. In a system defined by a semigroup, spaces H sub 1 (-t) and H sub 2 (-t) are introduced. When A is self-adjoint with discrete spectral resolution the feedback control can be found explicity. Bounded B is assumed. Wave and heat equation examples show that the control reacts more quickly than the linear quadratic solution to large error states, but more slowly to small disturbances. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-19900 Alabama Univ. in Huntsville.
OPTIMAL RENDEZVOUS BETWEEN CLOSE CIRCULAR ORBITS Ph.D. Thesis
Larry Douglas Plexico 1981 157 p
Avail: Univ. Microfilms Order No. 8128323

Optimal fixed time rendezvous trajectories between close circular orbits are determined. The scheme utilizes necessary conditions applied to equations of motion linearized about a point moving on a nearby reference orbit. Trajectories involving two, three, and four impulses are discussed. In the two impulse

case, direct comparisons are made between linear solutions and those derived using classical conic equations. The choice of reference orbit radius is critical in developing an accurate linear model. The development of a reference orbit whose radius depends on boundary conditions is described, and its advantages are discussed. Finally, a method for arriving at a nonlinear solution is described. Selected parameters from the linear solution are applied to classical conic equations, and a series of Lambert problems are solved. Dissert. Abstr.

N82-19901 South Carolina Univ., Columbia.
STOCHASTIC CONVERGENCE OF RANDOMLY WEIGHTED SUMS Ph.D. Thesis
Carol Ann Calhoun 1981 71 p
Avail: Univ. Microfilms Order No. 8129445

The stochastic convergence of randomly weighted sums S sub n is investigated. To obtain convergence of weighted sums involving Banach space valued random variables, some geometric conditions must be placed on the Banach space. The classical strong law of large numbers holds only in Banach spaces of type p. Direct analogs of results for random weights were obtained by placing certain independence conditions on the weights and by assuming the Banach space of type p. However, in obtaining an analog of the result, a more restrictive condition is needed on the Banach space, namely that of p smoothability due to the possible lack of independence of the special weights under consideration. Also, an example shows that if the weights and the Banach space valued random variables are dependent, then S sub n may not converge almost surely or in probability. Hence, the correlation between the weights and the Banach space valued random variables must be considered. Dissert. Abstr.

N82-19902 Royal Aircraft Establishment, Farnborough (England).
AN EXAMINATION OF STABILITY CRITERIA FOR ITERATIVE NUMERICAL SCHEMES USED IN SOLVING DIFFERENTIAL EQUATIONS
Katherine Moore Jul. 1981 35 p refs
(RAE-TR-81081; RAE-Aero-3508; BR81080) Copyright. Avail: Issuing Activity

The stability of numerical schemes for solving algebraic finite difference equations, resulting from finite difference approximations to differential equations, is discussed. It is suggested that the von Neumann method together with its stability criterion provides a reasonably simple way of determining stability. However, there are limitations in its applicability, which are indicated. The method is tested in two examples. How best to treat first and mixed derivative terms, occurring in differential equations, is indicated. Author (ESA)

N82-19903 Sheffield Univ. (England). Dept. of Control Engineering.
ASYMPTOTIC PROPERTIES OF UNKNOWN SYSTEMS
D. H. Owens Sep. 1981 6 p refs Presented at I.E.E.E. Conf. CDC, San Diego, California, 1981
(RR-156) Avail: Issuing Activity

Controller design for multivariable systems with uncertain dynamics, and the difficulty of making precise theoretical predictions based on uncertain data, is discussed. Formalization of this problem and description of how asymptotic analysis which plays an important role in the presence of severe plant uncertainty was examined by differential sensitivity methods and, by adaptive and self tuning control. Low gain and high gain theories are considered. Asymptotic analysis for root loci and singular perturbations is cited. The framework for a systematic design tool is presented. A theorem is proven for the typical structure, providing existence and parameterization of stabilizing controllers, along with an asymptotic characterization of performance. Author (ESA)

N82-19904*# PEDA Corp., Palo Alto, Calif.
CONSERVATIVE SUPRA-CHARACTERISTICS METHOD FOR SPLITTING THE HYPERBOLIC SYSTEMS OF GASDYNAMICS FOR REAL AND PERFECT GASES Progress Report, 1 Jul. 1980 - 31 Sep. 1981
C. K. Lombard Jan. 1982 37 p refs
(Contract NAS2-10744)
(NASA-CR-166307) Avail: NTIS HC A03/MF A01 CSCL 12A

A conservative flux difference splitting is presented for the hyperbolic systems of gasdynamics. The stable robust method is suitable for wide application in a variety of schemes, explicit or implicit, iterative or direct, for marching in either time or space. The splitting is modeled on the local quasi one dimensional characteristics system for multi-dimensional flow similar to Chakravarthy's nonconservative split coefficient matrix method; but, as the result of maintaining global conservation, the method is able to capture sharp shocks correctly. The embedded characteristics formulation is cast in a primitive variable the volumetric internal energy (rather than the pressure) that is effective for treating real as well as perfect gases. Finally the relationship of the splitting to characteristics boundary conditions is discussed and the associated conservative matrix formulation for a computed blown wall boundary condition is developed as an example. The theoretical development employs and extends the notion of Roe of constructing stable upwind difference formulae by sending split simple one sided flux difference pieces to appropriate mesh sites. The developments are also believed to have the potential for aiding in the analysis of both existing and new conservative difference schemes. M.G.

N82-19905# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FUZZY INFERENCE USING A MODIFIED MODUS PONENS RULE [INTERENCIA NEBULOSA UTILIZANDO O MODUS PONENS MODIFICADO]
deOliveira Orion Silva and Celso de Renna Esouza Sep. 1981 29 p refs In PORTUGUESE; ENGLISH summary Presented at 33rd Reuniao Ann. da SBPC, Salvador-Bahia, Brazil, 8-15 Jul. 1981
(INPE-2224-PRE/020) Avail: NTIS HC A03/MF A01

The modus ponens inference rule for fuzzy premises and conclusion can be described as follows: If x is P, then y is Q (represented by (x,y) is (Bar-P' + Bar-Q); x is R; therefore, y is Ro (Bar-P' + Bar-Q); where P' is the complement of P,Bar-P' is the cylindrical extension of P' over the universe of Q,Bar-Q is the cylindrical extension of Q over the universe of P, and + is the bounded sum operation. It follows that is R = P, all values of the tribution Po (Bar-P' + Bar-Q) are greater than or equal to the corresponding ones from Q. The results that the values are > or = Q is due to a certain information loss in the application of +. Another binary operation is proposed, improving the result obtained when R = P. Moreover, the association of a degree of belief in the interval (0,1) to the implication is allowed, thus generalizing the fuzzy modus ponens rule. M.G.

N82-19906# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF PROBLEMS OF ILL-CONDITIONED REGRESSION OR WITH MULTICOLINEARITY [ESTUDO DE PROBLEMAS DE REGRESSAO MAL-CONDICIONADOS OU COM PRESENCA DE MULTICOLINEARIDADE]
Luiz Antonio Nogueira Lorena and Jose Roberto Reis [1982] 19 p refs In PORTUGUESE; ENGLISH summary Presented at 3rd Brazilian Econometrics Meeting, Pernambuco, Brazil, 8-11 Dec. 1981
(INPE-2234-PRE/022) Avail: NTIS HC A02/MF A01

Ill-conditioned linear regression models or models with multicolinearity are presented. The objective is to point out the bad effects resulting from perturbations in the estimated coefficients are shown, when the system of normal equations is ill-conditioned. The condition number of the normal matrix (presented in the correlation matrix form) is related to the multicolinearity problem. The ridge estimator is presented as alternative to the least squares one, when there exists strong multicolinearity. The relationship between these two estimators is shown. S.L.

N82-19907# Technische Hogeschool, Eindhoven (Netherlands).
ROUND-OFF ERROR ANALYSIS OF DESCENT METHODS FOR SOLVING LINEAR EQUATIONS Ph.D. Thesis
Joseph Antonius Maria Bollen 2 Dec. 1980 204 p refs
Avail: NTIS HC A10/MF A01

Round-off error analysis of iterative methods for solving linear systems are considered. The class of descent methods which is a large sub-class of iterative methods is studied. Special attention is paid to the gradient method and the conjugate gradient method,

often referred to as the steepest descent method. A number of results on the good-behavior and numerical stability of the gradient method and the conjugate gradient method for both well- and ill-conditioned systems are presented. Computational tests to verify the results of round-off error analysis are also discussed. M.D.K.

N82-19908# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SOLUTION OF PROBLEMS WITH TIME AS AN INDEPENDENT VARIABLE, USING THE FINITE ELEMENT METHOD [SOLUCAO DE PROBLEMAS COM O TEMPO COMO VARIAVEL INDEPENDENTE, ATRAVES DO METODO DE ELEMENTOS FINITOS]
Santiago Alves Tavares Nov. 1981 16 p refs In PORTUGUESE; ENGLISH summary Presented at the INPE-LCC Seminar, Rio de Janeiro, 25-27 Nov. 1981
(INPE-2269-PRE/050) Avail: NTIS HC A02/MF A01

The solution by finite element methods of two classes of problems, where time appears as the independent variable, is analyzed, they are: (1) optimum control Bolza problem; and (2) initial value problem of parabolic type. Validation of the method is established by applying to particular problem with known solutions. Author

N82-19909# Princeton Univ., N. J. Dept. of Statistics.
COMPARISON OF THE BIOPTIMAL CURVE FOR TWO ROBUST ESTIMATES
Katherine Bell Krystinik and Stephan Morgenthaler Oct. 1981 12 p refs Revised
(Contract DAAG29-79-C-0205)
(AD-A109132; TR-195-SER-2; ARO-16669.12-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

The performance of one-step biweights and Bob Bell estimates are compared with the performance of the bioptimal estimates. This is done for sample sizes 5, 10 and 20. The two situations are the Gaussian and slash. Author (GRA)

N82-19910# Naval Ship Research and Development Center, Bethesda, Md. Computation, Mathematics and Logistics Dept.
ACCELERATION OF CONVERGENCE OF A VECTOR SEQUENCE BY REDUCED RANK EXTRAPOLATION Final Report, 1975 - 1980
Robert P. Eddy Nov. 1981 60 p refs Presented at the 1st Ann. Workshop on the Inform. Linkage Between Appl. Math. and Ind. Monterey, Calif., 23-25 Feb. 1978 Submitted for publication
(AD-A108765; DTNSRDC-81-084) Avail: NTIS HC A04/MF A01 CSCL 12/1

A new family of methods, called reduced rank extrapolation, is developed for accelerating convergence of the sequence of vectors generated during the iterative solution of a system of m linear algebraic equations in m unknowns. Large systems of this kind arise, for example, in the finite difference or finite element solution of partial differential equations. Reduced rank extrapolation is derived from full rank extrapolation, which is a straightforward generalization to vector space of the well known Aitken delta sq.-shanks e sub 1, scalar extrapolation. It is applicable when the iteration has reached a point where only a few, say r, eigenvalues dominate the situation and hence only r difference vectors can be linearly independent to specified tolerance. The rank, r, is determined during the solution of an auxiliary problem of best approximation in vector space, i.e., 'best' in the sense of minimizing some specified vector norm. Least squares theory, corresponding to the Euclidean norm, is developed in detail herein. Application to Laplace's equation in a square and in a cube yielded reduction in computation time by a factor ranging between 2.4 and 4.7, and reduction in iteration count by a factor ranging between 3.6 and 5.4. Author (GRA)

N82-19911# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
COMMENTS ON THE DOUBLY ASYMPTOTIC APPROXMATION. 2: A SIMPLE APPROXIMATION FOR CUTOFF VELOCITY Final Report, Jan. - Jun. 1981
David W. Nicholson and Martin H. Marcus 15 Sep. 1981 14 p refs
(AD-A108926; NSWC/TR-81-329-2) Avail: NTIS HC A02/MF A01 CSCL 19/4

A model problem is used to examine the error of a simple approximation, obviating the calculation of relief pressures used in the Doubly Asymptotic Approximation. The error is a function of a quantity which may be interpreted as the ratio of structural response times to fluid pressure decay times. The greatest relative error is about 27% and usually is somewhat less, suggesting the use of a simple 'correction factor' for cutoff velocity. Author (GRA)

N82-19912# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.
ACCELERATED CONVERGENCE OF STRUCTURED BANDED SYSTEMS USING CONSTRAINED CORRECTIONS Final Report, Oct. 1980 - Aug. 1981
Karl Kneile AEDC Dec. 1981 22 p
(AD-A108805; AEDC-TR-81-22) Avail: NTIS HC A02/MF A01 CSCL 12/1

Descretization of fluid flow equations results in a structured banded system of equations. Interative methods used to solve such a system transfer information rapidly between neighboring points but exhibit slow global communication when the system is large. This phenomenon results in a slow convergence with the asymptotic stages showing a spatially smooth behavior for the errors, iterative corrections, and residuals. This smooth behavior is exploited by approximating the error and corrections with an interpolation over a selected subset of the grid. A variational form is used to compress the original system of equations into a smaller system. This compression is repeated through several levels of grid sizes to obtain a dramatic improvement in convergence rate. A relaxation parameter is dynamically calculated at each step with a negligible increase in computational effort. Although the method was developed for solving full potential flow using a variational principle, it is applicable to other problems with the structured banded property. Author (GRA)

N82-19913# University of Southern California, Los Angeles. Electronic Sciences Lab.
SYNCHRONIZATION PATTERNS AND RELATED PROBLEMS IN COMBINATORIAL ANALYSIS AND GRAPH THEORY
Herbert Taylor Jun. 1981 100 p refs
(Contract N00014-80-C-0745)
(AD-A108888; USCEE-509) Avail: NTIS HC A05/MF A01 CSCL 12/1

Several theorems about graphs and their application are discussed. General topics include: odd path sums in an edge-labeled tree; counting induced subgraphs; choosability in graphs; the M-pire problem; and two dimensional synchronization patterns for minimum ambiquity. M.G.

N82-19914# Harvard Univ., Cambridge, Mass. Computation Lab.
K-CONNECTIVITY IN RANDOM UNDIRECTED GRAPHS
John H. Reif and Paul G. Spirakis 1981 19 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A108826; TR-19-81) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper concerns vertex connectivity in random graphs. We present results bounding the cardinality of the biggest k-block in random graphs of the G sub n,p model, for any constant value of k. These results generalize those of (Erdos, Renyi, 60) and (Karp, Tarjan, 80) for k = 1 and 2. We furthermore prove here that the cardinality of the biggest k-block is > or = n-logn with probability > or = 1/n-squared for p > or = c1(k)/n and c1(k) > k + 2. We also show that if p > or = c(k)(logn)/n with c(k) > 32 k-squared then the graph G sub n,p is k-connected with probability > or = 1-2n to the -d'(k) power, d'(k) > 1. GRA

N82-19915# Harvard Univ., Cambridge, Mass. Computation Lab.
STRONG K-CONNECTIVITY IN DIGRAPHS AND RANDOM DIGRAPHS
John H. Reif and Paul G. Spirakis Oct. 1981 31 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109034; TR-25-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper concerns an extension of the strong connectivity

notion in directed graphs. A digraph D is k-strongly connected if, for each x,y vertices of D, there exist > or = k vertex disjoint paths from x to y and also > or = k vertex disjoint paths from y to x. A k-strong block of a digraph D is a maximal k-strongly connected subgraph of D. We show here how many results about the k-blocks in undirected graphs extend to k-strong blocks in digraphs. (Separation lemma, overlapping of k-strong blocks, number of them.) We prove, for example, that the maximum number of k-strong blocks for all k > or = 1 in any n-vertex graph is ((2n-1)/3). We also prove that two k-strong blocks cannot have more than k-1 vertices in common. We furthermore present results bounding the cardinality of the biggest k-strong block in random digraphs of the D(n,p) model. This work generalizes previous work on random undirected graphs. GRA

N82-19916# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

ROTATIONALLY SYMMETRIC OPERATORS FOR SURFACE INTERPOLATION

Michael Brady and Berthold K. P. Horn Nov. 1981 38 p refs (Contract N00014-80-C-0505)

(AD-A109032; AI-M-654) Avail: NTIS HC A03/MF A01 CSCL 12/1

The use of rotationally symmetric operators in vision is reviewed and conditions for rotational symmetry are derived for linear and quadratic forms in the first and second partial directional derivatives of a function f(x, y). Surface interpolation is considered to be the process of computing the most conservative solution consistent with boundary conditions. The 'most conservative' solution is modelled using the calculus of variations to find the minimum function that satisfies a given performance index. To guarantee the existence of a minimum function, Grimson has recently suggested that the performance index should be a seminorm. It is shown that all quadratic forms in the second partial derivatives of the surface satisfy this criterion. The seminorms that are, in addition, rotationally symmetric form a vector space whose basis is the square Laplacian and the quadratic variation. Whereas both seminorms give rise to the same Euler condition in the interior, the quadratic variation offers the tighter constraint at the boundary and is to be preferred for surface interpolation. Author (GRA)

N82-19917# Naval Postgraduate School, Monterey, Calif.

COMPUTATIONAL ADVANCES IN LARGE-SCALE NONLINEAR OPTIMIZATION M.S. Thesis

Dennis Ross Dean Sep. 1981 135 p refs

(AD-A109528) Avail: NTIS HC A07/MF A01 CSCL 12/1

This is a comparison of two state-of-the-art large-scale nonlinear optimization systems exhibiting unprecedented problem solution capabilities both in size of problem handled and method of solution. These codes are MINOS, developed by B.A. Murtagh and M.A. Saunders, and XS, developed by G. G. Brown and G. W. Graves. The codes are evaluated with respect to their problem solving capabilities and potential for practical application by analysts. Computational results are presented for thirteen nonlinear and nonlinear mixed integer test problems with from two to 793 variables (12 to 100 integer variables) and one to 401 constraints. Portions of this work were presented at the CORS/ORSA/TIMS joint meeting in Toronto, May 1981.

Author (GRA)

N82-19918# Kaiserslautern Univ. (West Germany). Fachbereich Mathematik.

ALGORITHM FOR THE CALCULATION OF THE LARGEST INTEGER IN THE SQUARE ROOT OF A NATURAL NUMBER [EIN ALGORITHMUS ZUR BERECHNUNG DER GROESSTEN GANZEN AUS WURZEL D]

Heinz Lueneburg 1980 6 p ref In GERMAN

(Preprint-11) Avail: NTIS HC A02/MF A01

The preparation of algorithms to calculate the square root of a natural number (d) for a computer program is outlined. The total of the first-n odd number equals n-square. The PASCAL program calculates (square root-d) for d Epsilon N. Different auxiliary theorems are demonstrated to calculate square root-d. It is concluded that the instructions for the repeat curve of this program are more complicated than the instructions for the while curve of the first program in which the number of steps is much smaller, and the total gain is considerable.

Transl. by E.A.K.

N82-19919# Loughborough Univ. of Technology (England). Dept of Mathematics.

ON PYTHAGOREAN TRIANGLES AND COPRIME LATTICE POINTS

P. Shiu Oct. 1980 16 p ref

(MATHS-Res-154) Avail: NTIS HC A02/MF A01

Topics in number theory are discussed. By a Pythagorean triangle, a triangle with coprime positive integer sides X, Y, Z, satisfying X squared + y squared = z squared, is meant. For N > or = 1, F(N) denotes the number of Pythagorean triangles that have hypotenuse N. By a lattice point (X, Y), a point with integer coordinates X, Y is meant. If X, Y are nonzero coprime integers, then (X, Y) is a coprime lattice point. The number of ways of writing N as a sum of two squares of integers, or the number of lattice points on the circle a squared + b squared = N, is set. For N > or = 1, let F(N) = the summation, for 1 < or = N < or = N, of F(N). A heuristic argument, then a formal proof, which show that F(N) has the average value 1/pi and that F(N) is zero for almost all N, are given. More precisely, the theorem that as N tends to infinity, F(N) = (N/pi) + O (square root of N) is developed. Author (ESA)

N82-19920# Loughborough Univ. of Technology (England).

A VARIABLE METRIC METHOD USING A NON-QUADRATIC MODEL

A. Tassopoulos and C. Storey Jun. 1981 17 p refs

(MATHS-Res-158) Avail: NTIS HC A02/MF A01

The problem of finding an unconstrained local minimizer X of a continuously differentiable function F(X) with X an element of R sup N is dealt with. A model for the variable metric method is proposed and tested, using an updating formula that generates a sequence (brackets X sub K), K = 0, 1, 2, ... of approximations to a local minimizer of F(X). Finite termination can be proved for the variable metric method, using the proposed model and applied to several standard test functions of different dimensionality. Numerical results show that the proposed model behaves as efficiently as the currently used model in general and is more efficient for problems of higher dimensionality. Author (ESA)

N82-19921# Royal Inst. of Tech., Stockholm (Sweden). Inst. foer Haallfasthetslaera.

CALCULATION OF EQUIVALENT FORCES AT NODES. SOME EXAMPLES IN ACTUAL PRACTICE FOR CALCULATIONS WITH THE FEM METHOD [ALLOKERING AV NODKRAFTER. NAAGRA PRAKTISKA EXEMPEL FOER BERAEKNING MED FEM]

Kjell Eriksson 1980 59 p ref In SWEDISH

(KTH-Publ-212) Avail: NTIS HC A04/MF A01

The finite element method is introduced and its use in calculating discrete forces, e.g. distributed loads found in constructions such as frames, is outlined. Basic functional analysis theory is presented along with coordinate transformation calculation from local to global coordinates. Twenty-six equivalent force calculations are given, including rectangular, trapezoidal, triangular, and nonsymmetric curved edge structures. The variable load problem is also discussed. Author (ESA)

N82-19922# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

SPINOR GENERA OF ORDERS AND QUADRATIC FORMS

J. Brzezinski 1981 38 p refs

(CTH-Math-1981-20) Avail: NTIS HC A03/MF A01

A group of spinor genera of orders in central simple algebras over fields of quotients of Dedekind rings is defined and computed in particular cases. As an application to the theory of integral quadratic forms, a necessary and sufficient condition is given for a genus of ternary semi-Bass quadratic forms to consist of only one spinor genus. As a consequence of this, a generalization of classical results about genera of indefinite ternary quadratic forms, consisting of only one class, is obtained.

Author (ESA)

N82-19923# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.

APPLICATIONS OF A GENERAL COMPARISON THEORY

FOR CONVOLUTION INTEGRALS
Joergen Loefstroem 1981 41 p refs
(CTH-Math-1981-21) Avail: NTIS HC A03/MF A01

Some Tauberian theorems with applications to approximation theory are extended. Let X be a Banach space and B a Banach algebra of tempered distributions on R sup d. For F belongs to B put F sub (lambda) (x) = (lambda sup d) F (lambda X). The space of all test functions such that (double modulus F sub (lambda) * test function; Omega) sub X = the convolution integral of (lambda to the minus s power) as lambda tends to infinity is characterized when Omega is all of R sup d or a bounded subset of R sup d. The proofs are based on the Shapiro comparison theorem. Author (ESA)

N82-19924# Sheffield Univ. (England). Dept. of Control Engineering.
NORM BOUNDS FOR LINEAR SYSTEMS USING STEP RESPONSE DATA
D. H. Owens and A. Chotai Sep. 1981 24 p refs
(Contract SERC-GR/B/23250)
(RR-159) Avail: NTIS HC A02/MF A01

Norms for operators which pertain to the stability and approximation theory of linear and nonlinear systems are considered. How certain induced operator norms can be bounded for continuous and discrete systems, using plant step response data only, is described. For continuous systems, a stable m-output/l-input, linear time-invariant system is associated with a mapping L of the Banach space C sup l (zero, infinity) of bounded continuous mappings. The mapping L is represented by a convolution integral equation. The approach taken is to reduce the evaluation of the double modulus of L to the evaluation of single-input/single-output systems. To do this, the system is decomposed into a l-input/single-output stable system. Relations between the norms are identified and proven, relating the norm of L to the impulse response matrix H(+). Given the impulse response data H(+) and D, the double modulus of L can be computed, or bounded. The result shows that only a countable (and, in many cases, finite) amount of step response data is needed to evaluate the double modulus of L. The results carry over with little change to the analysis of a stable, l-input/m-output, linear, time-invariant discrete system. Examples are given.
Author (ESA)

N82-19925# Sheffield Univ. (England). Dept. of Control Engineering.
ON THE COMPENSATION OF OPTIMAL SYSTEM ASYMPTOTIC ROOT-LOCI
D. H. Owens Nov. 1981 11 p refs Revised Previously announced as RR-101
(Contract SERC-GR/B/79455)
(RR-163; RR-101) Avail: NTIS HC A02/MF A01

A procedure for manipulating the free parameters of the asymptotes of the optimal closed-loop poles of a time invariant linear regulator as the weight of the input in the performance criterion approaches zero by suitable choice of weighting matrices Q and R is described. A systematic method for choosing Q and/or R in order to produce arbitrary, specified values of the parameters lambda sub jr, l < or = r < or = d sub j, l < or = j < or = q is indicated. A duality between Q and R is outlined and used to reduce the problem to that of developing procedures for the choice of R. Results are presented as an algorithm. The choice of Q and R such that they produce specified values for the free parameters of the system asymptotes, is achieved, but the choice of lambda sub jr can not be achieved theoretically. Author (ESA)

N82-19926# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abteilung Automatisierung.
CONTOUR RECOGNITION AND MEASUREMENTS USING FOURIER TRANSFORMATION
Klaus Arbter Sep. 1981 34 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-745)
(DFVLR-Mitt-81-22; ESA-TT-745) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 8,80

By means of Fourier transformation, a number of features characterizing a given contour are derived, called Fourier descriptors, and which by their invariance to translation, rotation and size, are particularly suited for contour recognition such as required in TV tracking systems. The descriptors are shown to be unique, insensitive to random contour errors and to represent complex contours by few complex numbers. Formulas for contour measurement and for numerical Fourier transformation of line scanned contours are given. The properties of the proposed method are illustrated in several examples. Author (ESA)

N82-20137# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
TWO-STEP IMPLICIT SCHEMES FOR THE SOLUTION OF A CONSERVATION EQUATION
H. Hollanders and R. Peyret *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 61-67 refs Transl. into ENGLISH of La Rech. Aerospatiale Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 287-294 (For primary document see N82-20131 10-99) Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-19927# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SELECTION OF ATTRIBUTES APPLIED TO MULTISPECTRAL IMAGES [SELECAO DE ATRIBUTOS APLICADA A IMAGENS MULTISPECTRAIS]
Fernando A. Mitsuo Ii Jan. 1982 92 p refs In PORTUGUESE; ENGLISH summary
(INPE-2303-TDL/072) Avail: NTIS HC A05/MF A01

Classes of Gaussian distribution are defined, given a multispectral scene of 12 channels. The best channels for separating classes are identified using the J-M distance criterion. The quantitative analysis of these interclass separations is also discussed. M.G.

N82-19928# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ON A LOCALLY OPTIMAL PROCEDURE BASED ON RANKS FOR COMPARISON OF TREATMENTS WITH A CONTROL
Deng-Yuan Huang and S. Panchapakesan Jul. 1981 10 p refs
(Contract N00014-75-C-0455)
(AD-A109283; MMS-81-30) Avail: NTIS HC A02/MF A01 CSCL 12/1

Let Phi sub 1,...,Phi sub k be independent populations representing k experimental treatments and let Phi sub O be the control treatment. Let f(x,Theta sub i denote the density of Phi sub i, i = O,1,...,k, satisfying certain regularity conditions. Any population Phi sub i is said to be superior to the control if Theta sub i > Theta sub O, and inferior otherwise. We assume that the value of Theta sub O is unknown but a good upper bound Theta sub O* is known. We are interested in selecting a subset (possibly empty) of the k experimental treatments consisting of the ones that are superior to the control. Though the functional form of f(x,Theta) is assumed to be known, we derive a procedure based on ranks in view of the usual considerations of robustness against possible deviations from the model. In deriving the rule, we control the error probabilities and maximize the ability to detect a superior population in a certain local sense. The rule is based on the ranks of the obvservations in a pooled sample of (k+1)n (n from each population) observations. In the special case of logistic density, this rule is expressed in terms of the rank-sum statistics. Author (GRA)

N82-19929# Naval Ocean Systems Center, San Diego, Calif.
ASYMPTOTIC NORMALITY OF AUTOREGRESSIVE PARAMETER ESTIMATES FOR MIXED TIME SERIES
D. F. Gingras Sep. 1981 16 p refs
(AD-A108781; NOSC/TR-733) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this report it is shown for mixed time series, a series

generated by an autoregressive moving-average (ARMA) process or by an autoregressive process observed in additive white noise (AR+N), that estimates of the autogressive (AR) parameters are asymptotically multivariate jointly normal with zero mean and finite covariance matrix. The structure of the asymptotic covariance matrix is evaluated for both types of mixed time series.
Author (GRA)

N82-19930# Tennessee Univ., Knoxville. Dept. of Psychology.
ESTIMATION OF THE OPERATING CHARACTERISTICS WHEN THE TEST INFORMATION OF THE OLD TEST IS NOT CONSTANT. 2: SIMPLE SUM PROCEDURE OF THE CONDITIONAL P.D.F. APPROACH/NORMAL APPROACH METHOD USING THREE SUBTESTS OF THE COLD TEST, NUMBER 2
Fumiko Samejima Jul. 1981 136 p refs
(Contract N00014-77-C-0360)
(AD-A109112; RR-81-2) Avail: NTIS HC A07/MF A01 CSCL 12/1

This is a continuation of a previous study reported as RR-80-4, 'Estimation of the Operating Characteristics When the Test Information of the Old Test Is Not Constant II: Simple Sum Procedure of the Conditional P.D.F. Approach/Normal Approach Method Using Three Subtests of the Old Test'. In that study, a new method of estimating the operating characteristics of discrete item responses based upon an Old Test, which has a non-constant test information function, was tested upon each of two subtests of the original Old Test, Subtests 1 and 2. The results turned out to be quite successful. In the present study, Subtest 3, which contains as small a number of test items as fifteen, was used as the Old Test. Unlike the previous study, we have an additional challenge of handling negative and positive infinities of the maximum likelihood estimate obtained upon Subtest 3.
Author (GRA)

N82-19931# Harvard Univ., Cambridge, Mass. Computation Lab.
RANDOM INDEPENDENCE SYSTEMS
John H. Reif and Paul G. Spirakis Nov. 1981 26 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109046; TR-32-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report introduces a new random structure generalizing matroids. These random independence systems allow us to develop general techniques for solving hard combinatorial optimization problems with random inputs.
GRA

N82-19932# Harvard Univ., Cambridge, Mass. Computation Lab.
PROBABILISTIC ANALYSIS OF RANDOM EXTENSION-ROTATION ALGORITHMS
John H. Reif and Paul G. Spirakis Oct. 1981 55 p refs
(Contract N00014-80-C-0674; Grant NSF MCS-79-21024)
(AD-A109035; TR-28-81) Avail: NTIS HC A04/MF A01 CSCL 12/1

We introduce a new random structure generalizing matroids. The random independence systems (RIS) allow us to develop general techniques for solving hard combinatorial optimization problems with random inputs. We describe a randomized algorithm for efficiently constructing an independent set of fixed size in an instance of a random independence system. We provide a general method of analysis of the performance of this algorithm, which allows us to derive bounds on the mean, variance and all the moments of the time complexity of the algorithm.
Author (GRA)

N82-19933# Loughborough Univ. of Technology (England).
A K-SAMPLE EXTENSION OF TUKEY'S 2-SAMPLE QUICK TEST
E. Ioannou Oct. 1981 24 p refs
(MATHS-Res-159) Avail: NTIS HC A02/MF A01

Exact null and asymptotic null distributions of the test statistic are derived; tables of critical values and tail probabilities are presented. A Monte Carlo study, comparing the power of the test with other K-sample tests, is also included. The performance of the test is evaluated and its treatment of ties is discussed. The main advantage of the quick test is that it does not involve the tedious arithmetic usually necessary in parametric tests nor the ranging of all the data as required by most nonparametric tests.
Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-19934 International Institute for Applied Systems Analysis, Laxenburg (Austria).
SHARING COSTS FAIRLY: A PRACTICAL INTRODUCTION TO COOPERATIVE GAME THEORY
H. Peyton Young, N. Okada, and T. Hashimoto Sep. 1981 33 p ref
(ER-5) Copyright. Avail: Issuing Activity

Traditional methods of allocating costs of water facilities are compared with more recently developed methods, involving game theory, in order to show how these methods work in actual use and to give a pratical introduction to game theory. The problem of sharing the costs of a joint water supply facility between cities is explained. Eight ways of dealing with this problem are outlined and evaluated. Popular game theory methods of cost allocation have significant advantages over naive methods. However, in actual applications, it may be unrealistic to expect the kind of information and technical understanding that game theory requires. There are cases where using a single numerical criterion for costing, such as apportioning costs by population or by demand, are preferable to more complicated methods.
Author (ESA)

N82-19935# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A MODEL FOR DIMENSIONING A CORRECTIVE MAINTENANCE SYSTEM M.S. Thesis - 17 Nov. 1980 [UM MODELO PARA DIMENSIONAMENTO DE UM SISTEMA DE MANUTENCAO CORRETIVA]
Fernando Manoel Athayde Reis Sep. 1981 208 p refs In PORTUGUESE; ENGLISH summary
(INPE-2233-TDL/064) Avail: NTIS HC A10/ A01

The design of an auxiliary tool to be used in systems planning, the objective of which is to maintain other systems, is discussed. The planner's task may be defined as the minimization of the relationship between the total cost of the maintenance system and the operating system availability, subjected to the restrictions of minimal acceptable availability and reliability for the operating system and a given budget. A simulation model is developed; interactions between the two systems and component supply are observed. The maintenance and repair tasks are reproduced. The simulation output consists of estimates for availability, total cost, and other statistics. This output allows the planner to evaluate changes in the objective function caused by variations in the maintenance system parameters.
M.G.

N82-19936# Harvard Univ., Cambridge, Mass. Computation Lab.
SYMMETRIC COMPLEMENTATION, REVISION
John H. Reif 1981 47 p refs
(Contract N00014-80-C-0647; Grant NSF MCS-79-21024)
(AD-A108823; TR-07-81-Rev) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper introduces a class of 1 player games of perfect information, which we call complementing games; the player is allowed moves which complement the value of successive plays. A complementing game is symmetric if all noncomplement moves are reversible (i.e., form a symmetric relation). These games are naturally related to a class of machines we call symmetric complementing machines. Symmetric nondeterministic machines were studied in (Lewis and Papadimitriou, 801): they are identical to our symmetric complementing machines with complement moves allowed only on termination. (A companion paper to appear will describe the computational complexity of symmetric complementing and alternating machines.) Of particular interest is the complexity class Sum *CSYMLOG, which contains the outcome problem of symmetric complementing games with constant complement bound with game positions encoded in

log space, and next move relations computable in log space. We show that the decision problem for a restricted quantified Boolean logic Sum *QBF sum is complete in Sum *CSYMLOG. We also show that Sum *CSYMLOG contains many well-known and common combinatiorial problems: minimum spanning forests; k-connectivity and k-connected components, and also the recognition problems for many classes of graphs: planar graphs of valence 3; chordal graphs; comparability graphs; interval graphs; split graphs, and permutation graphs. GRA

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-19937 New Mexico State Univ., Las Cruces.
STANDARD CONSTRUCTIONS IN ABELIAN GROUP THEORY Ph.D. Thesis
Anthony John Giovannitti 1981 107 p
Avail: Univ. Microfilms Order No. 8129387

The use of standard constructions in abelian group theory is examined. The definition of exactness in abelian categories is extended to pointed categories in a manner that does not lose the desirable properties of exactness. Properties of standard constructions on preabelian categories are explored and the properties needed to guarantee that the class of sequences exactly relative to a cotriple or triple, respectively, forms a proper class are specified. This is done by first showing that the intersection of the class of stable exact sequences and the class of sequences exactly relative to a standard construction is a proper class. Theorems generalizing some of the results for preabelian categories are presented. Several examples are given of standard constructions in categories that have proven important in abelian group theory. They by no means exhaust the known examples, but are meant to give some indication of the use of the theory developed here. Dissert. Abstr.

N82-19938# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
ON THE UNIFORM BOUNDEDNESS OF A FAMILY OF MATRICES AND THE APPLICATIONS TO ONE-LEG AND LINEAR MULTISTEP METHODS
Germund Dahlquist, Huang Mingyou, and Randall LeVeque (Stanford Univ., California) 1981 14 p refs Sponsored by People's Republic of China's Ministry of Education, Swedish Natural Research Council and NSF
(TRITA-NA-8101) Avail: NTIS HC A02/MF A01

In applications of multistep methods to stiff systems, e.g., to partial differential equations by the method of lines, the uniformity of the stability results obtained by analysis of the scalar linear test equation y' = lambda y with respect to the parameter q = lambda h is questioned. Results of this type are easily obtained by contractivity analysis. A simple proof of a complete answer to this question is found by proving a more general result through the use of the resolvent criterion of Kreiss. Let F be a set of matrices of bounded order with the properties: (1) individual power-boundedness, i.e., for each A belonging to F, m(A) is congruent to sup N (double modulus (A sup N) < infinity for N = 1,2...; (2) A belongs to F has no multiple eigenvalue of unit modulus; and (3) F is closed and bounded. Then F is uniformly power-bounded in the sense that there is a finite constant (m vector product) such that m(A) < or = (M vector product), for any A belonging to F. Author (ESA)

N82-19939# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
COURSE-OF-VALUES RECURSION ON LISTS IN INTUITIONIST TYPE THEORY
Jan Smith Sep. 1981 26 p refs
(CTH-Math-1981-19) Avail: NTIS HC A03/MF A01

A formalization of constructive analysis, intuitionist type theory, is considered for use as a programming language. In intuitionist type theory only primitive recursion is allowed. Since general recursion is extensively used in functional programming, alternative methods of constructing programs must be developed for type theory. It is shown how to reduce a useful scheme of course-of-values recursion on lists to primitive recursion, using a higher-order function. As an example, the method is used to construct a program in type theory for the sorting algorithm QUICKSORT. Author (ESA)

N82-19940# Sheffield Univ. (England). Dept. of Control Engineering.
VARIABLE STRUCTURE SYSTEMS AND SYSTEM ZEROS
O. M. E. El-Ghezawi, S. A. Billings, and A. S. I. Zinober Sep. 1981 15 p refs
(RR-157) Avail: NTIS HC A02/MF A01

Variable structure system (VSS) theory is used to derive a method for computing the zeros of a linear, time invariant multivariable system. The system zeros are the eigenvalues of a reduced order matrix which arises naturally in VSS design. The properties of the algorithm are investigated by decomposing the state space. The algorithm proves valuable when determining the state and input zero directions since the calculation of the (n+m) dimensional null space of system matrix P(s) is avoided. The algorithm is computationally fast and easy to implement. Author (ESA)

N82-19941# Sheffield Univ. (England). Dept. of Control Engineering.
EXPANSION OF LINEAR AND SEMI-LINEAR SYSTEMS AND THE POPOV CRITERION
S. P. Banks Oct. 1981 30 p refs
(RR-158) Avail: NTIS HC A03/MF A01

The extension of linear systems in order to reveal properties which are not apparent in the contracted form is introduced. The extension of the state vectors for a linear system leads to a definition of generalized extensions via expansive resolutions. The concept is widened in order to include semilinear systems, where Anderson's generalization of the Popov criterion can be extended by removing the condition that the complete linear part generates the positive real matrix pi sub o(s), and replacing it by the weaker condition that diagonal submatrices of the extended linear part have corresponding real matrices pi sub o sup i(s). Author (ESA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-19942# Technische Hogeschool, Delft (Netherlands).
SOME APPLICATIONS OF THE PERTURBED DIRECTIONAL CORRELATION TECHNIQUE IN NUCLEAR PHYSICS, SOLID STATE PHYSICS AND RADIO CHEMISTRY Ph.D. Thesis
Robert Wilhelmus Hollander 11 Mar. 1981 174 p refs
(ISBN-90-6231-084-2) Avail: NTIS HC A08/MF A01

The 'perturbed directional correlation technique' for nuclear physics experiments is the linking factor of the described experiments, which differ considerably in subject. The interaction between magnetic dipole and electric quadrupole moments of excited nuclear states and 'perturbing' extranuclear magnetic fields and electric field gradients are used in order to extract nuclear information, if the perturbing fields are known, or to obtain informaion about the external fields, if the relevant nuclear properties are known. The measuring technique is the same for the different experiments, however, the experiment set-ups are not. Some aspects of a set-up for the determination of the nuclear g factor of short lived nuclear states are described. S.L.

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-19943*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
USER'S GUIDE TO NOISE DATA ACQUISITION AND ANALYSIS PROGRAMS FOR HP9845: NICOLET ANALYZERS

Michael C. McGary Feb. 1982 40 p refs
(NASA-TM-83256) Avail: NTIS HC A03/MF A01 CSCL 20A

A software interface package was written for use with a desktop computer and two models of single channel Fast Fourier analyzers. This software features a portable measurement and analysis system with several options. Two types of interface hardware can alternately be used in conjunction with the software. Either an IEEE-488 Bus interface or a 16-bit parallel system may be used. Two types of storage medium, either tape cartridge or floppy disc can be used with the software. Five types of data may be stored, plotted, and/or printed. The data types include time histories, narrow band power spectra, and narrow band, one-third octave band, or octave band sound pressure level. The data acquisition programming includes a front panel remote control option for the FFT analyzers. Data analysis options include choice of line type and pen color for plotting. A.R.H.

N82-19944*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF FACILITY VARIATION ON THE ACOUSTIC CHARACTERISTICS OF THREE SINGLE STREAM NOZZLES

Orlando A. Gutierrez 1980 38 p refs Presented at the 100th Meeting of the Acoust. Soc. of Am., Los Angeles, 17-21 Nov. 1980
(NASA-TM-81635; E-646) Avail: NTIS HC A03/MF A01 CSCL 20A

The characteristics of the jet noise produced by three single stream nozzles were investigated statistically at the NASA-Lewis Research Center outdoor jet acoustic facility. The nozzles consisted of a 7.6 cm diameter convergent conical, a 10.2 cm diameter convergent conical and an 8-lobe daisy nozzle with 7.6 cm equivalent diameter flow area. The same nozzles were tested previously at cold flow conditions in other facilities such as the Royal Aircraft Establishment (RAE) 7.3 m acoustic wind tunnel. The acoustic experiments at NASA covered pressure ratios from 1.4 to 2.5 at total temperatures of 811 K and ambient. The data obtained with four different microphone arrays are compared. The results are also compared with data taken at the RAE facility and with a NASA prediction procedure. Author

N82-19945# National Aerospace Lab., Tokyo (Japan). Noise and Emission Research Group.

AERODYNAMIC NOISE GENERATED BY JET WING/FLAP INTERACTIONS OF THE EXTERNAL USB CONFIGURATION OF STOL AIRCRAFT. PART 2: FULL SCALE MODEL EXPERIMENT USING FJR710 TURBOFAN ENGINE

Masataka Maita, Shigemi Shindo, Shin Nakayama, Masakatsu Matsuki, Tadao Torisaki, Mitsuo Morita, Akira Yoshida, Katsumi Takeda, Shizuo Sekine, and Hiroshi Kondo Oct. 1981 26 p refs
(NAL-TR-687T-Pt-2; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Acoustic characteristics of the external upper surface blowing (USB) concept of a propulsive lift configuration were studied by full scale model static experiments. Test components included an FJR710 turbofan engine with an acoustically treated nacelle and a USB wing/flap assembly. These were utilized in conjunction with the ground verification testing of the propulsive systems of the National Aerospace Laboratory Quiet STOL Research Aircraft. Results were compared with the previous 8% scale cold flow model data. The defect of shielding provided by the wing/flap surface on aftradiated turbofan engine noise was studied and some attempts were made to reduce USB noise. Author

N82-19946*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 1

William E. Zorumski Feb. 1982 180 p refs 2 Vol.
(NASA-TM-83199-Pt-1; L-14805-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 20A

Aircraft noise prediction theoretical methods are given. The prediction of data which affect noise generation and propagation is addressed. These data include the aircraft flight dynamics, the source noise parameters, and the propagation effects. R.J.F.

N82-19947*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL, PART 2

William E. Zorumski Feb. 1982 296 p refs 2 Vol.
(NASA-TM-83199-Pt-2; L-14805-Pt-2) Avail: NTIS HC A13/MF A01 CSCL 20A

Detailed prediction methods for specific aircraft noise sources are given. These sources are airframe noise, combustion noise, fan noise, single and dual stream jet noise, and turbine noise. Modifications to the NASA methods which comply with the International Civil Aviation Organization standard method for aircraft noise prediction are given. R.J.F.

N82-19948# Stanford Univ., Calif.

ACOUSTIC MICROSCOPY AT CRYOGENIC TEMPERATURES Annual Summary Report, 1 Jul. 1980 - 30 Jun. 1981

C. F. Quate and J. Heiserman Nov. 1981 13 p refs
(Contract N00014-77-C-0412; NR Proj. 384-924)
(AD-A109271; SU-GL-3369) Avail: NTIS HC A02/MF A01 CSCL 20/1

This report summarizes our progress in a research program devoted to high resolution acoustic microscopy and cryogenic temperatures. During the past year we have studied the acoustic properties of two cryogenic fluids - liquid argon and liquid 4He below the temperature of 0.5 degrees K. In argon we have determined that nonlinear effects provide us with a dramatic increase in resolving power for focused acoustic beams. In liquid helium we have measured the attenuation versus temperature of sound at 1 GHz where the wavelength is less than 2500 A. The predicted behavior below 0.5 degrees K where the attenuation varies as the fourth power of temperature is confirmed for the first time at these small wavelengths. It gives us further confidence in our program to realize an instrument that will permit us to examine our specimens with an acoustic probe that is less than 1000 A in diameter. GRA

N82-19949# Naval Research Lab., Washington, D. C. Acoustics Div.

SPHERICAL ACOUSTIC BROADBAND RECEIVER Final Report, Fiscal Year 1981

W. James Trott 16 Dec. 1981 42 p refs
(AD-A109273; NRL-MR-4633) Avail: NTIS HC A03/MF A01 CSCL 17/1

The development of a hydrophone array for determining signal bearing in three dimensions is described in theory and experiment. The array of omnidirectional elements, on a spherical surface is shaded in amplitude to produce a frequency-independent directional response. Design of omnidirectional elements is discussed. Author (GRA)

N82-19950# Defence Research Establishment Valcartier (Quebec).

ALGORITHMS FOR TRACKING A SOUND SOURCE USING FREQUENCY AND BEARINGS

C. Kent Sep. 1981 66 p refs
(AD-A109276; DREV-R-4199/81) Avail: NTIS HC A04/MF A01 CSCL 20/1

This report develops some of the analytical support for algorithms designed to permit one or more mobile searchers to track a sound source moving in a straight line. The searchers measure bearing and received frequency to infer range, the true frequency and velocity components. The measurements of bearing and frequency are subject to random errors.
Author (GRA)

N82-19951# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

A FINITE ELEMENT METHOD FOR COMPUTING SOUND PROPAGATION IN DUCTS CONTAINING FLOW Final Technical Report, Dec. 1975 - May 1981

Dennis W. Quinn Sep. 1981 31 p refs
(AD-A108836; AFWAL-TR-81-3087) Avail: NTIS HC A03/MF A01 CSCL 20/1

Solutions for equations which describe sound propagation in nonuniform ducts containing flow are computed with a finite element approach. A least squares approach is considered and

compared to a Galerkin approach. The least squares problem is solved using an iterative method and compared with results obtained using direct Gaussian elimination. The accuracy of linear basis functions on triangles, bilinear basis functions on rectangles, and biquadratic basis functions on rectangles are compared. The biquadratics permit good approximation of curved boundaries and better convergence than the bilinear basis functions. The finite element solution space consists of piecewise biquadratics defined on the finite element discretization of the geometry of the duct. Acoustic fields within uniform ducts both with and without flow were computed. For nonuniform ducts without flow, the computed acoustic fields also compare well with exact or other computed solutions. For the case of two-dimensional flow within nonuniform ducts, sample calculations favorably compare with other solutions or limiting cases. GRA

N82-19952# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

ACOUSTIC MEASUREMENTS OF F100-PW-100 ENGINE OPERATING IN HUSH HOUSE NSN 4920-02-070-2721 Final Report, May - Sep. 1981

Vincent R. Miller, G. A. Plzak, and J. M. Chinn Sep. 1981 58 p refs

(AD-A108814; AFWAL-TM-81-133-FIBE) Avail: NTIS HC A04/MF A01 CSCL 20/1

The purpose of this test program was to measure the acoustic environment in the hush house facility located at Kelly AFB Texas during operation of the F100-PW-100 engine to ensure that engine structural acoustic design limits were not exceeded. The acoustic measurements showed that no sonic fatigue problems are anticipated with the F100-PW-100 engine structure during operation in the hush house. The measured acoustic levels were less than those measured in an existing F100-PW-100 engine wet-cooled noise suppressor, but were increased over that measured during operation on an open test stand. It was recommended that the acoustic load increases measured in this program should be specified in the structural design criteria for engines which will be subjected to hush house operation or defining requirements for associated equipment. Author (GRA)

N82-19953# TRW Defense and Space Systems Group, Redondo Beach, Calif.

INVESTIGATION OF SHALLOW BULK ACOUSTIC WAVES Final Report, 1 Oct. 1978 - 19 Sep. 1981

K. H. Yen, R. S. Kagiwada, K. F. Lau, and R. B. Stokes 12 Nov. 1981 53 p refs

(Contract DAAG26-78-C-0043)

(AD-A109028; ARO-15367.7-EL) Avail: NTIS HC A04/MF A01 CSCL 20/1

This final report summarizes the most important results of the Investigation of Shallow Bulk Acoustic Waves (SBAW) program. This program was conceived on the principle that SBAW technology could lead to devices that are superior to those presently available for frequency filtering and control. The primary objective was to establish whether this technology could provide devices that were as stable as the low frequency bulk wave resonators and yet operate at frequencies higher than the surface acoustic wave devices. The investigations have shown that SBAW devices can be built with excellent temperature stability, low spurious modes and at frequencies higher than those of SAW devices and bulk wave resonators. GRA

N82-19954# Aeritalia S.p.A., Naples (Italy). Acoustics Group.

GUIDELINES FOR THE DESIGN OF INHERENTLY QUIET AIRLOOPS FOR MANNED SPACECRAFT

Achille Carbone Paris ESA Dec. 1980 270 p refs

(Contract ESTEC-3840/79/NL-PP(SC))

(ACUN-8006; ESA-CR(P)-1477) Avail: NTIS HC A12/MF A01

Acoustic factors in spacecraft cabin design are treated. Criteria for setting interior noise requirements and the response of crew members to the noise environment experienced during missions are reviewed. Typical noise sources of environmental control systems, methods available for noise control, acoustical optimization of system and procedures for assessment of component target noise are presented. Fan noise and the techniques available for its reduction at source are analyzed with methods for prediction and testing. Noise generation caused by interaction of flow with system components, like valves, heat exchangers, and CO2 control assemblies, is addressed. The principles of noise transmission with air flow and in the structure are discussed. A procedure for duct lining design and attenuation prediction is given. Acoustic material impedance models and testing techniques for linings and reactive mufflers are presented. Principles underlying the application of antivibration mounts and of damping materials are outlined. Author (ESA)

N82-19955# Research Inst. of National Defence, Linkoeping (Sweden). Huvudavdelning 3.

DETECTION OF PERIODICALLY FLUCTUATING NOISE [DETEKTERING AV PERIODISKT FLUKTUERANDE BRUS]

A. Gjaerdman and L. Goetherstroem Jun. 1981 17 p refs In SWEDISH

(FOA-C-30223-E1) Avail: NTIS HC A02/MF A01

A method which identifies ships by their high frequency noise characteristics is presented. Noise modulated by the periodic cavitation from the propeller is analyzed after demodulation. The signal to noise ratio (S/N) is directly proportional to the quotient of the predetector filter bandwidth to the postdetector filter bandwidth, multiplied by the square of the degree of modulation for low S/N on the input side of the detector. Author (ESA)

N82-19956# Loughborough Univ. of Technology (England). Dept. of Transport Technology.

AN EXPERIMENTAL STUDY OF THE EFFECTS OF AN INLET FLOW CONDITIONER ON THE NOISE OF A LOW SPEED AXIAL FLOW FAN

J. Scoles and J. B. Ollerhead Jan. 1981 92 p refs

(Contract AT/2170/049/XR)

(TT-8101) Avail: NTIS HC A05/MF A01

The effects of inflow condition on the noise generated by a 40kW, 560mm diameter, seven blade ducted fan at speeds up to 5000rpm in an anechoic chamber were measured. A 1.25m diameter hemisperical honeycomb flow conditioner (HFC) which could be fitted with an internal gauze liner was used. Fan entry flow was measured by static and rotating hot-wire anemometers. Noise levels in the first few harmonics of blade passing frequency are very sensitive to inflow condition, but the HFC reduces them to a residual level independent of upstream disturbance levels. Broadband noise is reduced (by a smaller amount) at high blade angles and flow rates. No systematic effect of the gauze liner is detected. Experimental difficulties are caused by unsteadiness in the chamber airflow which causes harmonic level fluctuations with amplitudes of up to 10dB. Although the inlet flow conditioner reduces these fluctuations markedly, long term variations reduce confidence in the data. Author (ESA)

N82-19957# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Technische Akustik.

NOISE MEASUREMENTS ON THE HELICOPTER BK 117 DESIGN. WEIGHTED NOISE LEVELS AND INFLUENCE OF AIRSPEED

Wolf R. Splettstoesser, Klaus P. Anders, and Karl-Heinz Spiegel Aug. 1981 93 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-748)

(DFVLR-Mitt-81-18) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 22,95

Noise measurements on the prototype helicopter BK 117 were performed in strict compliance with the proposed International Civil Aviation Organization regulations for noise certification of helicopters. Measurement procedure, noise data acquisition, analysis and reduction as well as applied correction procedures are described. Effective perceived noise levels (EPNL) and other noise descriptors were evaluated and related to the proposed noise limits. Additional level flyover tests with variable airspeed were conducted to investigate the resulting effect on the EPNL and other noise measures. Author (ESA)

N82-19958# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abteilung Technische Akustik.

COLLECTION AND EVALUATION OF PROPELLER AIRCRAFT NOISE CERTIFICATION DATA

Manfred Ahlswede and Klaus Peter Anders Aug. 1981 87 p refs In GERMAN; ENGLISH summary

(DFVLR-Mitt-81-20) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 25,20

More than 300 individual noise certification levels were measured for propeller driven airplanes up to 5700 kg takeoff weight and for powered gliders in accordance with the rules and regulations as set forth in International Civil Aviation Organization Annex 16. Information on the airplanes, the engines and the propellers is provided as well as on the prevailing meteorological parameters and the operational parameters together with acoustic data. Of the latter, the measured A-weighted levels with their 90% confidence limit are listed, the performance correction is given and the certification level as well as the noise-limit are provided. Data are evaluated by plotting the measured A-weighted levels versus the helical blade tip Mach number. Author (ESA)

N82-20135# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
SIMULATION USING COMPUTER-PILOTED POINT EXCITATIONS OF VIBRATIONS INDUCED ON A STRUCTURE BY AN ACOUSTIC ENVIRONMENT
P. Monteil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 43-49 Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 267-273 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-19959 Texas A&M Univ., College Station.
THE EVALUATION OF CHARGE TRANSFER MATRIX ELEMENTS IN LIGHT ION COLLISIONS WITH NON-RELATIVISTIC ATOMS Ph.D. Thesis
Shensheng Ann Chang Fitchard 1981 138 p
Avail: Univ. Microfilms Order No. 8128889

Charge transfer is the process in which an orbital electron is transferred between two colliding atoms or ions. The projectile ion is assumed to follow a straight line classical trajectory. As the projectile approaches the target, it provides a time dependent perturbation of the electrons which are attached to the target. The resulting time dependent Schroedinger equation is solved by expanding the wave function in a truncated set of Hilbert states centered on the target, or on the projectile, with coefficients which are found from a variational principle. The infinite rank operators which appear in the Schroedinger equation are thus replaced by finite matrices. The elements of these matrices are called charge transfer matrix elements. A technique is derived which allows a completely analytic evaluation of these elements. A computer program to calculate the elements was written. The resulting matrix elements are checked against approximate analytic expressions, and against a charge transfer code.
Dissert. Abstr.

N82-19960# Helsinki Univ. (Finland).
ON NUCLEAR KOETHE SPACES DEFINED BY DRAGILEV FUNCTIONS Ph.D. Thesis
Hannu Ahonen 18 Nov. 1981 61 p refs
(ISSN-0355-0087; ISBN-951-41-0431-5) Copyright. Avail: Issuing Activity

The class of nuclear Frechet spaces studied consists of the spaces L sub f(alpha,r). Here f is a real valued function of a real variable with certain convexity properties; this is a Dragilev function. The letter alpha stands for an increasing sequence (alpha sub j) of real numbers with lim sub j approaches limit of infinity alpha sub j = + infinity. The parameter r belongs to the set R U/+ infinity/. In the special case of so called slowly increasing Dragilev functions f all the spaces L sub f(alpha,r) are isomorphic to the power series spaces; otherwise they are isomorphic to one of the spaces L sub f(beta,-1), L sub f(beta,o), L sub f (beta,1), L sub f(beta,infinity) with some sequence beta. S.L.

N82-19961# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MEASUREMENTS OF THE ELECTRON-POSITRON ANNIHILATION LINE AT 511 KeV EMITTED FROM THE GALACTIC CENTER
Jeronimo Osvaldo Dias Jardim, Maria Virginia Alves Jardim, John Louis Benson, and Inacio Malmonge Martin Sep. 1981 14 p refs In PORTUGUESE; ENGLISH summary
(INPE-2222-PRE/018) Avail: NTIS HC A02/MF A01

The detection of the electron-positron annihilation line flux coming from the Galactic Center as a means to estimate the rate of positron production is examined. The results of the measurements of the 511 KeV line flux made with a gamma ray experiment in the energy interval 0.3 to 3 MeV, on-board a stratospheric Balloon are presented. The detector field of view looked at the galactic longitudinal interval -31 deg < L(II) < +41 deg. The observed flux is (6.70 + or - 0.85) x 0.001 photons/sq cm/s, which is in good agreement with the expected flux when assuming that the Galactic Center is a line source emitting uniformly. Some likely sources of positrons are also discussed. M.G.

N82-19962*# Wisconsin Univ. - Madison. Dept. of Physics.
ANOTHER SELF-SIMILAR BLAST WAVE: EARLY TIME ASYMPTOTE WITH SHOCK HEATED ELECTRONS AND HIGH THERMAL CONDUCTIVITY
Donald P. Cox and Richard J. Edgar 1982 29 p refs
(Grant NGL-50-002-044)
(NASA-CR-168562) Avail: NTIS HC A03/MF A01 CSCL 20H

Accurate approximations are presented for the self-similar structures of nonradiating blast waves with adiabatic ions, isothermal electrons, and equation ion and electron temperatures at the shock. The cases considered evolve in cavities with power law ambient densities (including the uniform density case) and have negligible external pressure. The results provide the early time asymptote for systems with shock heating of electrons and strong thermal conduction. In addition, they provide analytical results against which two fluid numerical hydrodynamic codes can be checked. Author

N82-19963# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THERMALLY DISSOCIATED CHLORINE AND BROMINE MOLECULAR JETS Thesis [THERMISCH DISSOZIIERTE CHLOR- UND BROM-DUESENSTRAHLEN]
Juergen Frick Dec. 1980 109 p refs In GERMAN
(MPIS-26/1980; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 19,35

High temperature nozzle sources producing thermal dissociation of chlorine and bromine are described. Scattering between molecular potential functions in nonelastic transfer of energy processes and chemical reactions was investigated by molecular beam technique. It is shown that the recombination freezes up faster when the nozzlehole duct is shorter. Transl. by E.A.K.

N82-19964# RAND Corp., Santa Monica, Calif.
THE DEVELOPMENT OF HIGH-INTENSITY NEGATIVE ION SOURCES AND BEAMS IN THE USSR
Nikita Wells Sep. 1981 81 p refs
(Contract MDA903-78-C-0189; ARPA Order 3520)
(AD-A108935; RAND/R-2816-ARPA) Avail: NTIS HC A05/MF A01 CSCL 20/7

This report reviews Soviet R and D of (1) high-intensity negative ion sources and (2) transport and focusing of negative ion beams, using Soviet open literature of the past ten years, and correlates this data with data on Soviet institutes responsible for negative ion beam development. The Soviets are developing intense negative ion beams as the basis for creating neutral beams for injection into mirror traps and tokamaks, for inertial confinement fusion, and possibly for exoatmospheric beam weapon applications. The report focuses specifically on surface-plasma-type ion sources, which were first developed in the USSR and which show great promise for creating beams of high intensity, high brightness, and low emittance. Mechanisms for optimum negative ion beam transport are also discussed. GRA

N82-19965# RCA Labs., Princeton, N. J.
HIGH-ENERGY ION IMPLANTATION FOR MULTIGIGABIT-RATE GaAs INTEGRATED CIRCUITS Final Report, 1 May 1978 - 30 Jun. 1981
S. G. Liu, E. C. Douglas, C. P. Wu, C. W. Magee, and S. Y. Narayan Oct. 1981 166 p refs
(Contract N00014-78-C-0367; NR Proj. 383-046; RF54582001)
(AD-A108777; PRRL-81-CR-32) Avail: NTIS HC A08/MF A01 CSCL 07/4

The objectives of the program are to: (1) investigate high-energy ion implantation of donors into GaAs for multigigabit-rate GaAs integrated-circuit (IC) development and (2) to study the use of high-power lasers and other techniques for removing lattice damage and activating implanted species. GaAs ICs require the selective definition of n-layers in semi-insulating (SI) GaAs for the fabrication of active devices such as FETs, TELDs, and Schottky-barrier diodes. In order to fabricate such device elements, a capability for realizing n-layers with doping ranging from 10 to the 16th power to 5 x 10 to the 18th power/cc and thicknesses from 1 to 0.15 micrometer is required. Until the inception of this program, the major effort on ion implantation into GaAs has been at energies less than 500 keV, which limits the implant depth to typically less than several hundred nanometers. During this program, high-energy implantation of Si into SI GaAs at energies of 30 to 1200 keV has been investigated. Projected ranges and straggles have been measured by secondary ion-mass spectrometry (SIMS). Based on these measurements, we have produced up to approx. 1-micrometer-thick n-type GaAs layers at doping levels of approx. 5 x 10 to the 16th power to 1 x 10 to the 18th power/cc by multiple-energy Si implantation.
GRA

N82-19966# Williams Coll., Williamstown, Mass. Dept. of Physics.
RESONANCE STUDIES OF HYDROGEN ATOMS INTERACTING WITH VERY COLD SURFACES Annual Summary Report, 1 Mar. 1981 - 28 Feb. 1982
Stuart B. Crampton 16 Dec. 1981 8 p
(Contracts N00014-80-C-0240; JPL-95544; Grant NSF PHY-79-10967)
(AD-A109040; SBCONR2) Avail: NTIS HC A02/MF A01 CSCL 07/4

Experimental techniques and theoretical methods of analysis for the study of hydrogen atoms stored in containers having very cold surfaces are developed. The temperature dependence of the probability of adsorption and average time of adsorption of hydrogen atoms on frozen molecular hydrogen surfaces is measured. Recombination and other relaxations while adsorbed are studied. A high intensity state-selected hydrogen atom beam with thermal speeds at 6 K is developed and applied to atomic hydrogen maser development. Author (GRA)

N82-19967# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
MEASUREMENT OF INTEGRAL SCATTERING CROSS SECTIONS OF HYDROGEN ATOM-MOLECULAR SYSTEMS IN THE SUBTHERMAL RANGE Ph.D. Thesis - Georg-August Univ. [MESSUNGEN INTEGRALER STREUQUERSCHNITTE VON H-ATOM - MOLEKUELSYSTEMEN IM SUBTHERMISCHEN BEREICH]
Ulrich Schwalm Mar. 1981 129 p refs In GERMAN
(MPIS-5/1981; ISSN-0436-1199) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany GM 22,35

Three groups of hydrogen atom molecular systems with high energy disintegration to relative integral total scattering profiles were measured. Orbiting resonances in each group were observed. The H-atom of hydrogen halide compounds shows clear van der Waal reactions. The measuring methods are applied to weak anisotropic yet reactive scattering systems. Scatter profile measurements of the systems provide information on occurrences of orbiting resonances in strong anisotropic potentials. Experimental determination of orbiting resonances are important in the recombination of gas phase reactions when stabilization occurs through a further burst with a third particle. Transl. by E.A.K.

N82-19968# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazioni.
THE NUCLEON EXCHANGE MECHANISM IN COMPOSITE NUCLEI INTERACTION
G. Ciangaru (New York State Univ., Stony Brook) 15 May 1981 87 p refs
(ISS-R-81/4; ISSN-0390-6477) Avail: NTIS HC A05/MF A01

Nucleon exchange density matrices are introduced as a means of reducing the calculations involved in theoretical determinations of integral kernels. The matrices provide analytic expressions for nucleon exchange processes within the resonating group method framework. Nuclear shapes are assumed to be spherical. Mutual polarization of nucleon orbits is not considered. Only interactions leaving the nuclei in their ground states are treated. The method is exact when both nuclei are very light, both are heavy, or one is much heavier than the other. No approximation is achieved with two medium masses.
Author (ESA)

N82-20065# Illinois Univ., Urbana. Dept. of Physics.
ELECTRON KINETIC EQUATIONS IN COMPTONIZATION BY ISOTROPIC PHOTONS
Naoki Iwamoto *In* ESA Plasma Astrophys. Nov. 1981 p 331-332 refs Co-Sponsored with NORDITA (For primary document see N82-20030 10-88)
(Grant NSF PHY-80-25605)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20082*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
COMMENTS ON HIGH MACH NUMBER MAGNETOSONIC SHOCKS
K. Papadopoulos *In* ESA Plasma Asrophys. Nov. 1981 p 409-411 refs (For primary document see N82-20030 10-88)
(Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-19969*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY ANALYSIS OF ACCELERATED SPACE FLIGHT IONIZING RADIATION TESTING
J. W. Wilson, L. V. Stock (Old Dominion Univ.), D. J. Carter, and C. K. Chang (Christopher Newport Coll.) Jan. 1982 19 p refs
(NASA-TM-83209) Avail: NTIS HC A02/MF A01 CSCL 03B

A preliminary analysis shows that radiation dose equivalent to 30 years in the geosynchronous environment can be accumulated in a typical composite material exposed to space for 2 years or less onboard a spacecraft orbiting from perigee of 300 km out to the peak of the inner electron belt (approximately 2750 km). Future work to determine spacecraft orbits better tailored to materials accelerated testing is indicated. It is predicted that a range of 10 to the 9th power to 10 to the 10th power rads would be accumulated in 3-6 mil thick epoxy/graphite exposed by a test spacecraft orbiting in the inner electron belt. This dose is equivalent to the accumulated dose that this material would be expected to have after 30 years in a geosynchronous orbit. It is anticipated that material specimens would be brought back to Earth after 2 years in the radiation environment so that space radiation effects on materials could be analyzed by laboratory methods. A.R.H.

N82-19970# Los Alamos Scientific Lab., N. Mex.
NATURAL REPOSITORY ANALOGUE PROGRAM Progress

Report, 1 Oct. - 31 Dec. 1980
David B. Curtis, comp. Mar. 1981 19 p refs
(LA-8743-PR; Rept-1) Avail: NTIS HC A02/MF A01

One fission product, molybdenum, was found in rocks which were taken at distances between 1 and 40 meters from reactor zones. It is concluded that this element was mobilized in the nearby zones of criticality, transported over distances up to a few tens of meters and redeposited in these rocks. In contrast, the same samples contain undetectable quantities of both fissiogenic ruthenium or of the U-235 depleted reactor fuel. The redistribution processes enriched molybdenum by several orders of magnitude relative to ruthenium and uranium. Ores peripheral to reactor zones are, on the average, deficient in one half of the radiogenic lead. Rocks from the conglomerate underlying the mineralized stratum contain, on the average, 6000 ppm of excess lead. One sample contains a remarkable 34,000 ppm of unsupported radiogenic lead. This basal conglomerate must have been a major transport path and repository for lead lost from the ores. A.R.H.

74 OPTICS

Includes light phenomena.

N82-19971 Virginia Univ., Charlottesville.
APPLICATIONS OF INTEGRATED OPTICS TO SIGNAL PROCESSING AND PATTERN RECOGNITION Ph.D. Thesis
Arthur Onyekwere Anyiwo 1981 105 p
Avail: Univ. Microfilms Order No. 8129334

The problem of preprocessing remotely sensed data to achieve high data rate reduction is addressed. Two distance measure optical processors that operate on the principle of interferometry are proposed. Processing algorithms (parametric and nonparametric) that take full advantage of the statistical dependence of the sensed data on their neighbors as well as the high processing speed of the optical processors are developed. System performance is evaluated and it is shown that intensity fluctuations of the optical source (laser) can have an adverse effect on the entire system. A second problem which involves the detection of electromagnetic interference sources in computer subsystems is solved as a two-class pattern recognition problem. A hybrid optical/digital system for implementation is developed. An integrated optical time-integrating correlator is interfaced with other analog and digital subsystems to yield compact test equipment. The effects of first-order sources of degradations on the correlator output and on the processing algorithms are investigated. It is shown that the processing algorithm is invariant under the degrading effects on the correlator output.
Dissert. Abstr.

N82-19972*# Howard Univ., Washington, D. C.
CHARACTERIZATION OF LOW INTENSITY X-RAY IMAGING DEVICES (LIXISCOPE) Final Report, 15 Jun. 1979 - 31 Dec. 1981
George A. Ferguson 31 Dec. 1981 19 p refs
(Grant NsG-5268)
(NASA-CR-168584) Avail: NTIS HC A02/MF A01 CSCL 20F

Radioisotopic sources were used to excite the LIXISCOPE in preliminary experimental attempts to evaluate the usefulness of this instrument for industrial and medical applications. The characteristics of the LIXISCOPE when excited by X-ray produced by conventional electrically powered X-ray generators were studied. The optimum X-ray spectrum was determined and the mode of operation of the generator, which yields satisfactory LIXISCOPE images of medical and industrial specimens was investigated.
S.L.

N82-19973# Colorado State Univ., Fort Collins. Dept. of Chemistry.
LIGHT SCATTERING FROM MACROMOLECULAR SYSTEMS: MOLECULAR CRYSTALS AND POLYMERS Final Technical Report
Elliot R. Bernstein Nov. 1981 32 p refs
(Grant AF-AFOSR-3317-77; AF Proj. 2303)
(AD-A109086; AFOSR-81-0861TR) Avail: NTIS HC A03/MF A01 CSCL 07/4

The research objectives were to: (1) characterize phase transitions theoretically and experimentally in molecular crystal systems; (2) use the above understanding gained by light scattering studies and theoretical interpretation to apply to the more complex system of lyotropic liquid crystals; and (3) then apply knowledge gained on the model systems of increasing complexity to polymer liquid crystals and solid polymers as observed by laser light scattering techniques. Systems experimentally and theoretically discussed are: trioxane, triazine, benzil, and chloranil. Studies of lyotropic liquid crystals (sodium decyl sulfate, sodium sulfate, decanol, water) have progressed. The major findings are: a number of phase transitions occur between 20 and 60 C; these transitions evidence strong critical behavior and long correlation times for fluctuations; and liquid crystals can be studied by light scattering. Spectra of solid powders, ribbons, and liquid crystals of PBT and solid PBO were obtained. GRA

N82-19974# Defence Research Establishment Valcartier (Quebec).
DETECTION RANGE PROBABILITIES OF PASSIVE INFRARED SYSTEMS FOR THE NORTH ATLANTIC
A. Laflamme Sep. 1981 90 p refs
(AD-A108812; DREV-R-4233/81) Avail: NTIS HC A05/MF A01 CSCL 17/5

In this report the probabilities of extinction of infrared radiation in the atmosphere, range probabilities for target detection by passive infrared surveillance systems are presented. The geographic area covered is the North Atlantic. The two major atmospheric infrared windows, the 3 to 5 and the 8 to 12 micrometer bands, are considered. The results allow to predict and compare readily the performance of detection systems. GRA

N82-19975# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
BACKSCATTER AND EXTINCTION IN WATER CLOUDS Final Report
R. G. Pinnick, S. G. Jennings, Petr Chylek, and Chris Ham Oct. 1981 52 p refs
(DA Proj. 1L1-61102-B-53A)
(AD-A109277; ERADCOM/ASL-TR-0097) Avail: NTIS HC A04/MF A01 CSCL 20/6

Atmospheric clouds can adversely affect the operation of military electro-optical systems. Probing of clouds by the lidar technique, is attractive for two reasons. First, it is a remote sensing technique, and measurements at ranges of several kilometers are possible. Second, it can give a two dimensional picture of the cloud and trace its time development. Unfortunately, in some cases meaningful information from a lidar backscatter signal is hard to obtain. In this report a linear relation between the volume extinction coefficient and backscatter coefficient of atmospheric cloud at visible and near infrared wavelengths is derived. The relation is in good agreement with Mie calculations of extinction and backscatter coefficients based on 156 measurements of cloud droplet spectra in cumulus and stratus type clouds. The relation suggests that visible or near infrared extinction coefficients in a cloud of unknown type could be inferred from lidar backscatter measurements alone. No similar size distribution independent relation between backscatter coefficient and liquid water content of cloud was found. GRA

N82-19976# Hughes Research Labs., Malibu, Calif.
POLARIZATION-INDEPENDENT OPTICAL WAVEGUIDE SWITCH Final Report, 12 Sep. 1980 - 12 Sep. 1981
O. G. Ramer Oct. 1981 70 p refs
(Contract N00173-80-C-0439)
(AD-A108764) Avail: NTIS HC A04/MF A01 CSCL 20/6

This highly successful program has resulted in the demonstration of an electrically activated planar waveguide polarization independent switch, one of the key components required to implement signal processing components. These switches operate at a wavelength of 0.83 micron and have optical crosstalk values of less than 20 dB. The switch is based on the delta beta-reversal directional coupler switch. The polarization independence is incorporated in the delta beta reversal switch by tapering the coupling strength of the directional coupler, and by fabricating

the waveguides so that the integrated coupling coefficients for TE and TM modes are nearly identical. Author (GRA)

N82-19977# Utah State Univ., Bedford, Mass. Electro-Dynamics Labs.

AIRCRAFT-BORNE MEASUREMENT OF INFRARED SOURCES AND BACKGROUNDS Final Report, 21 Oct. 1977 - 30 Jun. 1981

Ronald J. Huppi 30 Jun. 1981 61 p refs

(Contract F19628-78-C-0018; AF Proj. 7670; ARPA Order 2656)

(AD-A108871; EDL-SRL-81-3; AFGL-TR-81-0199) Avail: NTIS HC A04/MF A01 CSCL 20/6

Instruments for infrared measurements of natural and man produced infrared sources are described and measurements were planned, performed, and analyzed. The measured or analyzed data included the following: Measurements of aircraft emissions and reflections in fixed spectral bands between 2.5 and 7.5 micrometer; analyses of near infrared auroral and airglow emissions in the 1.7 micrometer and 2.8 micrometer region; and quantitative measurements and analyses of the spatial emissions and backgrounds in the 2 to 15 micrometer region. The measurements were taken with the radiometric instruments described and by spectrometers, and spatial mappers which were operated on AFGL's NKC-135 aircraft. The instruments were periodically inspected, maintained and kept in a state of readiness. Studies and recommendations were made indicating that the reliability of many future measurements could be improved using cryogenically cooled radiometers and interferometer-spectrometers. Author (GRA)

N82-19978# Lincoln Lab., Mass. Inst. of Tech., Lexington.

ACCURACY OF PARAMETER ESTIMATES FOR CLOSELY SPACED OPTICAL TARGETS USING MULTIPLE DETECTORS

Keh-Ping Dunn 23 Oct. 1981 57 p refs

(Contract F19628-80-C-0002)

(AD-A109185; TR-589; ESD-TR-81-292) Avail: NTIS HC A04/MF A01 CSCL 17/8

In order to obtain the cross-scan position of an optical target, more than one scanning detector is used. As expected, the cross-scan position estimation performance degrades when two nearby optical targets interfere with each other. Theoretical bounds on the two-dimensional parameter estimation performance for two closely spaced optical targets are found. Two particular classes of scanning detector arrays, namely, the crow's foot and the brickwall (or mosaic) patterns, are considered. Author (GRA)

N82-19979# Engins Matra, Velizy (France). Dept. Instrumentation.

OPTICAL IMAGING INSTRUMENTS FOR THE LAND APPLICATION SATELLITE SYSTEM. PHASE A STUDY. VOLUME 1 Final Report

Paris ESA 15 Sep. 1980 283 p refs Prepared in cooperation with Technische Physische Dienst TNO-TH and Royal Netherlands Aircraft Factories Fokker 2 Vol.

(Contract ESA-4167/79/F-CG(SC))

(Rept-60/1023-Vol-1; ESA-CB(P)-1480-Vol-1) Avail: NTIS HC A11/MF A01

System analysis and configuration tradeoffs were performed for a pushbroom imager operating in four visible bands and two reflected IR bands with a ground resolution of 30 m and a noise equivalent albedo of 0.5%. Results show that separate instruments are required for the visible and the IR bands. The visible band camera is designed around a pure dioptric 590 mm f/6.2 lens. A quasi-diffraction limited resolution is obtained over a 14 deg field of view for all spectral channels. A multichroic beam splitter is used for channel separation. The IR camera has a pure dioptric 590 mm f/2.95 lens. A Petzval system consisting of two convergent groups plus a divergent field corrector is adopted. Since the passive cooling of the detectors requires that the focal plane be parallel to the side of the spacecraft which does not receive sunlight, a flat folding mirror is placed between the last convergent group and the field corrector. Reliability of both cameras is 0.8 for two years in orbit. Author (ESA)

N82-19980# Engins Matra, Velizy (France). Dept. Instrumentation.

OPTICAL IMAGING INSTRUMENTS FOR THE LAND APPLICATION SATELLITE SYSTEM, PHASE A STUDY, VOLUME 2 Final Report

Paris ESA 15 Sep. 1980 183 p refs Prepared in cooperation with Technische Physische Dienst TNO-TH and Royal Netherlands Aircraft Factories Fokker 2 Vol.

(Contract ESA-4167/79/F/CG-SC)

(Rept-60/1023-Vol-2; ESA-CR(P)-1480-Vol-2) Avail: NTIS HC A09/MF A01

Focal plane assembly alignment and manufacturing problems for the visible band camera of the Land Application Satellite, are discussed. Spectral separation and photometric properties are treated. Charge coupled device detector properties and test program are outlined. Optical tolerances are analyzed. Structural and thermal models are given. Linear arrays of IR detectors for the 1.5 to 5 micron range of the IR camera, are evaluated. Passive coolers for low altitude polar orbits are discussed. Author (ESA)

N82-19981# Sener, S.A., Madrid (Spain).

DEVELOPMENT OF AN OPTICAL SCANNING MECHANISM ASSEMBLY (OSMA)

L. B. Fernandez Sainz Paris ESA Mar. 1981 91 p In ESTONIAN

(Contract ESTEC-3873/79)

(PS-1450; ESA-CR(P)-1490) Avail: NTIS HC A05/MF A01

A spaceborne OSMA design model was built in order to study the optimum conceptual design and investigate parameters that significantly affect oscillating scanner performance. Mass and inertia effects are considered. Scan linearity, frequency and efficiency are reported. Pointing stability, momentum compensation, and repeatability are examined. Improvements are needed in mirror compensating inertia, average difference between successive scans, and pointing stability. Analysis techniques perform well. Author (ESA)

N82-19982# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).

ELECTROOPTICAL EFFECTS FOR APPLICATION IN LIQUID CRYSTAL DISPLAYS Final Report

Guenter Baur, Gerhard Meier, Ekwal Sah, Bernd Scheuble, Axel Stieb, Waltraud Fehrenbach, and Friedrich Windscheid Bonn Bundesministerium fuer Forschung und Technologie Oct. 1981 129 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-81-170; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 27.30

In order to improve the optical characteristics of twisted nematic cells, the cell and material parameters necessary for optimal cell performance were evaluated and a variant of this cell type was characterized. For the development of liquid crystal mixtures with the respective properties, material investigations were carried out with a substantially increased accuracy. Further improvements of the fluorescence activated display allowed the construction of a prototype ready for production. The structure of the defects occurring in cholesteric layers was discovered in the case of homeotropic boundary alignment. Additionally, the contrast limits and optical merit factors of reflective dichroic cells were calculated, taking into account various optical interference factors. Author (ESA)

N82-19983# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Physik der Atmosphaere.

THE VISIBLE DETECTION OF AERIAL TARGETS AS A FUNCTION OF ENVIRONMENTAL, TARGET AND OBSERVATION PARAMETERS FOR SURFACE TO AIR OR AIR TO AIR OBSERVATIONS [DIE OPTISCHE ERFASSUNG VON LUFTZIELEN IN ABHAENGIGKEIT VON UMGEBUNGS-, ZIEL, UND BEOBACHTUNGSPARAMETERN BEI BEOBACHTUNGEN BODEN-LUFT BZW. LUFT-LUFT]

Hans-Eberhard Hoffmann Bonn Bundesministerium der Verteidigung 1981 47 p refs In GERMAN; ENGLISH summary

(BMVg-FBWT-81-12) Avail: NTIS HC A03/MF A01; DOKZENTBw, Bonn DM 30

The influence of different environmental, target and observa-

tional parameters on the maximum detection range of aircraft was studied in an outdoor test, using a dark green Do-27 airplane. The environmental parameters include the degree of turbidity of the atmosphere, background, direction of observation, flight altitude, and brightness. Size and color were considered as target parameters, whereas the observation conditions were differentiated according to naked eye or field glasses observations. Graphs showing these various dependencies are given. Although the observations were made from the ground, the results are shown to apply equally well to air to air observations.
Author (ESA)

N82-20121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CAPACITY LIMIT OF THE NOISELESS, ENERGY-EFFICIENT OPTICAL PPM CHANNEL
J. R. Lesh *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 54-58 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20F

N82-20134# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AIRCRAFT INFRARED RADIATION MODELING
G. Gauffre *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 21-41 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 245-265 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-19984 Iowa Univ., Oakdale.
THE SIMULATION OF PLASMA DOUBLE LAYER STRUCTURES IN TWO DIMENSIONS Ph.D. Thesis
Joseph Eric Borovsky 1981 203 p
Avail: Univ. Microfilms Order No. 8128373

Electrostatic plasma double layers are numerically simulated using a 21/2-dimensional particle-in-cell method. The system is represented by a two-dimensional grid, periodic in one direction and bounded by reservoirs of Maxwellian plasma in the other. The investigations concentrated on double-layer formation, stability, scaling, and morphology, on particle trajectories, and on electrostatic plasma waves. The temporal modulation of accelerated beams is also investigated; the possibilities of the double-layer production of ion conics and of ion precipitation are hypothesized; and the consequences of electrostatic plasma-wave excitement are discussed. Auroral double-layer simulations including the atmospheric backscattering of electrons which predict the presence of an ionospheric sheath which acts to confined ionospheric electrons and to accelerate ionospheric ions upward are also discussed. Dissert. Abstr.

N82-19985*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NUMERICAL METHOD FOR SOLVING THE VLASOV EQUATION
Nobuyuki Satofuka (Kyoto Technical Univ.) Feb. 1982 23 p refs
(NASA-TM-81339; A-8794) Avail: NTIS HC A02/MF A01 CSCL 20I

A numerical procedure is derived for the solution of the Vlasov-Poisson system of equations in two phase-space variables. Derivatives with respect to the phase-space variables are approximated by a weighted sum of the values of the distribution function at property chosen neighboring points. The resulting set of ordinary differential equations is then solved by using an appropriate time intergration scheme. The accuracy of the proposed method is tested with some simple model problems. The results for the free streaming case, linear Landau damping, and nonlinear Landau damping are investigated and compared with those of the splitting scheme. The proposed method is found to be very accurate and efficient. S.L.

N82-19986# Naval Research Lab., Washington, D. C.
LEVEL SHIFTS AND INELASTIC ELECTRON SCATTERING IN DENSE PLASMAS Interim Report
J. Davis and M. Blaha 10 Dec. 1981 35 p refs
(RR0110941)
(AD-A108799; NRL-MR-4689) Avail: NTIS HC A03/MF A01 CSCL 20/9

A completely quantum mechanical formalism has been developed to describe the high density plasma effects on fundamental atomic parameters. Both the bound and free electrons are treated by a method which in principle is similar to Hartree's self-consistent field method. The free plasma electrons' wavefunction is obtained from the Schrodinger equation with the effective potential representing the spherically averaged Coulomb interaction with bound and free electrons. Results are given for level shifts, coefficients of transition probabilities, and electron collision cross sections of Ne(9+) for temperature and 200 and 500 eV for an electron density range of 1 - 6 x 10 to the 24th power/cc, and of Ar(17+) for temperatures of 1000 and 2000 eV and electron densities from 2 x 10 to the 25th power to 8 x 10 to the 25th power/cc. In the low-density region, level shifts are obtained for H and He+. Author (GRA)

N82-19987# Naval Research Lab., Washington, D. C.
THE CAVITY Q FOR ERGODIC EIGENMODES Interim Report
Edward Ott and Wallace M. Manheimer 22 Dec. 1981 8 p
(AD-A109041; NRL-MR-4641) Avail: NTIS HC A02/MF A01 CSCL 14/2

The problem of calculating the Q of a very overmoded, irregularly shaped resonant cavity due to absorption of the electromagnetic radiation at the walls is considered. It is assumed that the volume inside the cavity can be either vacuum, or else partially filled with anisotropic inhomogeneous dielectric or plasma. Both the scale length of the dielectric and the radius of curvature of the walls are assumed much larger than the radiation wavelength. However, near the cavity walls, a vacuum is assumed. Focus is on applications concerning magnetically confined plasmas. GRA

N82-19988# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
AN APPENDIX TO THE PAPER PLASMA ELECTRON TEMPERATURE DETERMINATION IN LOW-DENSITY PLASMAS FROM THE HELIUM I 3889 A AND 5016 A LINE INTENSITIES
Nils Brenning 6 Oct. 1981 10 p refs Sponsored by Swedish Natural Science Research Council
(TRITA-EPP-81-03; ISSN-0348-7539) Avail: NTIS HC A02/MF A01

The use of the 3889 A line for measurements of plasma electron temperature is discussed, with comments on the requirement of optical thinness of the plasma against the 3889 A line radiation. The reduction in line intensity due to absorption is calculated and a useful range of parameters is determined within which plasma electron temperature determination is uninfluenced by the effects of absorption. Author (ESA)

N82-19989# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
SCALING LAWS OF THE MULTICOMPONENT COOL PLASMA MANTLE Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)
J. R. Drake, A. Kuthy, and M. Tendler Nov. 1981 14 p refs
(TRITA-PFU-81-04; ISSN-0348-7644) Avail: NTIS HC A02/MF A01

The two component plasma mantle was investigated theoretically and experimentally. In the case of classical transport, the plasma density is shown to vary as the cube root of the main neutral density at the wall. The impurity neutral density is shown to vary with the product of the square of the impurity ion density and the main neutral density in the diffusive regime, and as the product of the impurity ion density and the square

of the main neutral density for the convective regime. This latter was observed experimentally for plasma parameters corresponding to the convective regime, where the penetration of neutral helium into a cold and dense, but fully ionized, hydrogen plasma was compared with hydrogen penetration in the same plasma.
Author (ESA)

N82-19990# Sheffield Univ. (England). Dept. of Control Engineering.
ON OPTIMAL CONTROL OF PLASMA CONFINEMENT
S. P. Banks and S. A. Mousavi-Khalkhali (Univ. of Manchester Inst. of Technology, England) 1981 25 p refs
(RR-155) Avail: NTIS HC A02/MF A01

Feedback control of plasmas is considered by treating them as distributed parameter systems and using the lowest order approximation to Liouvilles equation as the state equation, given by the linearized Vlasov equation for a collisionless plasma. A control term is introduced into the Vlasov equation, which allows the plasma dynamics to be written in standard state space form. A quadratic cost functional is constructed on a Hilbert space. Optimal control is obtained in a standard way via the Riccati equation. Methods for obtaining finite-dimensional approximations to the solution are indicated. Author (ESA)

N82-20036# Oxford Univ. (England). Magdalen College.
MODULATIONAL INSTABILITIES IN ASTROPHYSICS
D. terHaar *In* ESA Plasma Astrophys. Nov. 1981 p 45-49 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20039# Academy of Sciences (USSR), Moscow. Inst. of Space Research.
WEAK TURBULENCE THEORY OF ENHANCED GAS IONIZATION BY PLASMA FLOW
A. A. Galeev *In* ESA Plasma Astrophys. Nov. 1981 p 77-82 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20040# Princeton Univ., N. J.
IDEAL MHD FLUIDS
Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 83-87 (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN and NO (+20% others)

N82-20047# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
PLASMA PROCESSES AT COLLISIONLESS SHOCK WAVES
V. Formisano *In* ESA Plasma Astrophys. Nov. 1981 p 145-165 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20071# Harry Diamond Labs., Adelphi, Md.
SECOND-ORDER NONLINEAR CONDUCTIVITY TENSOR FOR AN UNMAGNETIZED RELATIVISTIC TURBULENT PLASMA
Howard E. Brandt *In* ESA Plasma Astrophys. Nov. 1981 p 361-364 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20078# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
DOUBLE LAYER AND POTENTIAL JUMP: A REVIEW OF LABORATORY EXPERIMENTAL EVIDENCE
M. Guyot, C. Hollenstein, and M. Tran *In* ESA Plasma Astrophys. Nov. 1981 p 391-393 refs Sponsored by Swiss National Science Foundation and Euratom (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20084# Academia Sinica, Peking (China). Inst. of Space Physics.
A PLASMA CURRENT SHEET STUDIED BY MEANS OF THE PARTICLE MOTION
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1981 p 417-419 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N82-19991# Technische Hogeschool, Eindhoven (Netherlands).
GROWTH AND CHARACTERIZATION OF LIQUID PHASE EPITAXIALLY GROWN SPINEL FERRITE FILMS Ph.D. Thesis
Petrus Johannus Maria vanderStraten 7 Nov. 1980 102 p refs
Avail: NTIS HC A06/MF A01

The characteristics of ferrimagnetic and ferromagnetic materials are reviewed with particular emphasis on the uniaxial magnetic anisotropy which may be presented in liquid phase epitaxy (LPE) grown in spinel ferrite films. The properties of spinel ferrites are explored and the preparation of substrates for the growth of ferrite films are considered. The LPE growth procedure as well as methods for characterizing film thickness and film lattice parameters, composition, and saturation magnetization are described as well as magnetic anisotropies, the magnetic domain configuration and uniaxial anisotropy. The growth of indium substituted magnesium ferrite films, LPE growth of lithium-ferrite-alluminate films, LPE growth of copper ferrite films, stress induced anisotropy in LPE grown Ni(Fe, Al)2O4 films, and the LPE growth of Mn, Ni, and Al-substituted copper ferrite films are discussed.
A.R.H.

N82-19992# Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
ELECTROTRANSPORT IN THIN FILMS Final Report, 1 Jan. 1976 - 31 Dec. 1980
R. E. Hummel and R. T. DeHoff 27 Oct. 1981 61 p refs
(Grant AF-AFOSR-2963-76; AF Proj. 2306)
(AD-A108421; AFOSR-81-0708TR) Avail: NTIS HC A04/MF A01 CSCL 09/1

The objective of this research was to develop a scientific perspective that forms a foundation for understanding the processes that lead to the development of holes in thin film metal strips. This understanding allows the prediction and control of hole formation in thin film connectors that are in integral part of all microelectronic devices, thus extending their design lifetime, and improving their reliability. This project focused upon the effects of dopants on the behavior of thin films subject to high current densities, and upon the relative contributions of the several mass transport processes that may contribute to changes in the structure of film strips. Specifically, in addition to electrotransport, which may involve both electron wind and electrolysis effects, grain boundary grooving, driven by surface tension forces, and thermotransport, driven by temperature gradients, was found to significantly alter the structure of the strip. Experimental strategies have been developed which emphasize each of these contributions, permitting assessment of their relative roles in the overall process. GRA

N82-19993# Stanford Univ., Calif. Solid-State Electronics Lab.
ION IMPLANTATION AND LASER PROCESSING OF 3-5 COMPOUND SEMICONDUCTORS WITH APPLICATIONS TO THE FABRICATION OF MICROWAVE DEVICES Final Report, 1 Jun. 1978 - 31 May 1981
James F. Gibbons Oct. 1981 44 p refs
(Grant DAAG29-78-G-0119)
(AD-A109033; ARO-15605.5-EL) Avail: NTIS HC A03/MF A01 CSCL 20/12

Research was carried out on laser processing of 3-5

Compound semiconductors, concentrating on the mechanisms that are responsible for annealing ion implanted dopants in GaAs and on the possibility of obtaining laser-assisted diffusion of dopants. Seven papers describing this work have been written during the period covered by this report. A brief overview of these papers is given. The full papers are attached for detailed presentation of experimental conditions, theoretical calculations and results. Author (GRA)

N82-19994# Stanford Univ., Calif.
THE ELECTRONIC AND ATOMIC STRUCTURE OF DIAMOND SURFACE AND EFFECTS OF HYDROGEN TERMINATION Final Report, 1 Jul. 1978 - 30 Jun. 1981
B. B. Pate, P. J. Jupiter, I. Lindau, and W. E. Spicer 2 Nov. 1981 21 p refs
(Grant DAAG29-78-G-0130)
(AD-A109142; ARO-15878.3-P) Avail: NTIS HC A02/MF A01 CSCL 20/12

The electronic and atomic structure of the diamond (111) surface and the effects of hydrogen termination are studied using photoemission, photon stimulated desorption, low energy electron diffraction, and Auger electron spectroscopy. Hydrogen termination results in a 1 x 1 surface with no filled surface states in or near the band gap region. A high temperature anneal (approx. 1000 degrees C) removes the hydrogen and results in a 2 x 2/2 x 1 surface structure. Author (GRA)

N82-19995# Cornell Univ., Ithaca, N. Y. Dept. of Chemistry.
SIMS STUDIES ON ANOMALOUS BEHAVIOR OF PHOSPHORUS AND OTHER IMPLANTS IN SILICON Interim Technical Report
Paul K. Chu, Dachang Zhu (Fudan univ., Shanghai), and George H. Morrison 17 Dec. 1981 22 p refs Sponsored in part by NSF
(Contract N00014-80-C-0538; NR Proj. 051-736)
(AD-A108870; TR-6) Avail: NTIS HC A02/MF A01 CSCL 07/4

A phosphorus implant in p-type silicon was analyzed by SIMS, and both the implant profile and the matrix signal were observed to exhibit some anomalous behavior. Further studies revealed the same behavior in other implants. This phenomenon was observed when an n-type dopant was implanted into a p-type matrix, or vice versa. However, some exceptions arose, making the interpretation difficult. The use of matrix signal normalization was adopted and found to improve the results. Author (GRA)

N82-19996# IBM Federal Systems Div., Manassas, Va. Federal Systems Div.
ELECTRICAL CHARACTERIZATION OF SUPER SCHOTTKY Final Technical Report
R. A. Lawrence Griffiss AFB, N.Y. RADC Jul. 1981 229 p
(Contract F30602-80-C-0068; AF Proj. 2338)
(AD-A108766; RADC-TR-81-194) Avail: NTIS HC A11/MF A01 CSCL 09/1

State-of-the-art bipolar logic technology has advanced with the recent introduction of 'Super Schottky' and 'Low Power Super Schottky' product lines by two semiconductor manufacturers. Texas Instruments (T.I.) and Fairchild Semiconductor have utilized advances in processing techniques such as oxide isolation and refinements in the resolution of photolithographic equipment to enhance the speed and reduce the power of present day Schottky (S) and Low Power Schottky (LS) technologies. This report provides results obtained from the electrical characterization over the military temperature range (-55 CTj to +125 CTj) of gate and flip-flop samples of three new transistor Transistor Logic (TTL) technologies; Advanced Schottky (AS), Advanced Low Power Schottky (ALS), and Fairchild Advanced Schottky (TTL) (FAST). This report shows that each technology offers the system designer unique advantages in terms of improved performance, power reductions, and space savings derived from functional design complexity. The performance improvements obtained by these new logic technologies, however, present implicit new application and testing considerations that could previously be ignored by the military system designer. GRA

N82-19997# Massachusetts Inst. of Tech., Cambridge. Magnet Lab.
IMPURITY AND DEFECT CHARACTERIZATION IN EPITAXIAL GaAs, InP AND THE TERNARY AND QUATERNARY COMPOUND SEMICONDUCTORS Annual Interim Report, 1 Aug. 1980 - 31 Jul. 1981
Kenneth J. Button and M. N. Afsar 14 Oct. 1981 17 p refs
(Grant AF-AFOSR-3708-78; AF Proj. 2306)
(AD-A109052; AFOSR-81-0849TR) Avail: NTIS HC A02/MF A01 CSCL 20/2

An ultimate method for the unambiguous identification of donors in epitaxial GaAs and related compounds has been devised and demonstrated. A specimen is grown by means of the molecular beam epitaxy technique and is lightly doped with a single donor element during growth so as to render the specimen n-type. The far infrared photoconductivity method of spectroscopy is used to determine the energy difference between the electron ground state and the next higher excited state (2p, m = -1) at low temperature and in high intensity magnetic fields. A 'signature curve' of energy vs. magnetic field intensity is generated for various values of applied magnetic field intensity. Thereafter, any time that this particular element is present as a residual donor in any other specimen, a single measurement at any field will yield a point which must lie on the signature curve of the particular donor element. By this means any residual donor can be identified without ambiguity. We have generated and published signature curves for Sn, Se, Si, Ge and sulfur. Author (GRA)

N82-19998# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
TRANSITION ELECTRON MICROSCOPE (TEM) IN-SITU STRAINING AND BULK STUDIES OF THE SELECTION OF GLIDE SYSTEMS IN FACE CENTERED CUBIC (FFC) CRYSTALS Ph.D. Thesis - Delft Univ. of Technologie
H. J. Kolkman Jun. 1980 116 p refs
(NLR-TR-80041-U) Avail: NTIS HC A06/MF A01

Plastic deformation of FCC metals was studied during straining experiments with a TEM on single Cu and Al crystals in order to ascertain whether the thin specimens used in TEM straining experiments give information on the plastic deformation process representative of bulk behavior. In situ TEM straining experiments on copper single crystalline foils with an area transparent to electrons and with four different foil plane normals were performed. The experimental procedure is described. In bulk crystals, and in thin foil specimens with the same orientation, the same nonprimary systems were observed, demonstrating that the choice of glide systems is governed not only by their resolved shear stresses, but also by the crystallographic orientation of the surface. Results are compared with published results for body centered cubic crystals and recommendations for future studies are given. Author (ESA)

N82-19999# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).
ANALYSIS OF DEEP DEFECTS IN III-V SEMICONDUCTORS Final Report, Mar. 1981
Juergen Schneider, Ulrich Kaufmann, Helmut Ennen, and Rico Woerner Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 61 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technology
(BMFT-FB-T-81-197; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

Special point defects in GaP and GaAs by electron spin resonance (ESR) and optical spectroscopy are reported in order to establish the influence of deep defects in III-V semiconductors. Stoicheometric defects assessed by ESR in GaP are the antisite defect, P sub Ga, and the isolated gallium vacancy, V sub Ga. Results show that P sub Ga is an intrinsic defect characteristic for light emitting crystal GaP which may act as a center for nonradiative Auger recombination. An important group of extrinsic defects formed by ubiquitous three dimensional transition metal impurities was identified: (1) double acceptor behavior of Fe, Ni, and Cr in GaP and of Ni in GaAs; (2) hole trapping of Cr in GaP and GaAs; and (3) strong association tendency of Ni with donors in GaP. The importance of these results for GaP-LED efficiency optimization and for GaAs-FET performance is stressed. Author (ESA)

N82-20000# Technische Universitaet, Munich (West Germany). Inst. fuer Anorganische Chemie.
PREPARATION OF COMPOUNDS WITH NEW STRUCTURES FOR SUPERCONDUCTOR INVESTIGATIONS Final Report, Dec. 1980
Eberhard Amberger Bonn Bundesministerium fuer Forschung und Technology Nov. 1981 21 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-81-203; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,60

The relation between the superconductive and the structural properties of superconductors was confirmed by comparing the X-ray structures of five classes of compounds, involving metal clusters, with their superconductive properties. The various substances were prepared following a common recipe: (1) clusters with small metal distance; (2) large metal-metal distance between clusters; and (3) cluster interconnection by means of a different atom type. The results confirm the cluster theory of superconductive compounds. Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N82-20001 New Hampshire Univ., Durham.
SPECIAL APPLICATIONS OF IRREVERSIBLE THERMODYNAMICS Ph.D. Thesis
Yakov Michael Zilberberg 1981 321 p refs
Avail: Univ. Microfilms Order No. 8129272

The main irreversible phenomena that occur in thermoviscoelastic solids and fluids, namely, the absorption and propagation of the sound waves and the influence of thermal energy conduction and dissipation within the said media upon the phenomena are evaluated and analyzed. The theoretical methods of such analysis, specifically those of evaluation of the spatial attenuations of the sound wave propagating through a thermoviscoelastic media (solid or fluid) contain a substantially incomplete and very restricted in its validity procedure which is based upon a dimensional modification of the temporal attenuations. Specifically, the sound absorption coefficient, gamma, defined as the ratio of the mean value of the mechanical energy dissipation to twice the mean energy flux of the wave, is dimensionally modified by dividing it by the transverse or longitudinal velocities of sound in a given media, which procedure formally permits to obtain a dimensionally consistent result. Dissert. Abstr.

N82-20002# Technische Hogeschool, Eindhoven (Netherlands).
IMPURITIES IN QUASI ONE-DIMENSIONAL SYSTEMS. A STUDY ON SOME THERMODYNAMIC PROPERTIES Ph.D. Thesis
Joseph Christophorus Schouten 20 Jan. 1981 140 p refs
Avail: NTIS HC A07/MF A01

The effect of impurity in a magnetic system depends on the character of the impurity (magnetic or nonmagnetic) as well as on the dimensionality of the system. Amorphous and random magnetic systems are defined and the theoretical methods used to compute the behavior of quasi-one dimensional mixed magnetic systems with anisotropic interactions are presented. Various Mn (++) systems mixed with Cu or Cd are described. As well as the magnetic properties of the quasis one dimensional system (CH3)2NH2MnCl3. Quasi one dimensional systems Co(++) systems, mixed with Cu are discussed as well as the mixed CsMn (Cl sub(1-x) Br sub x)3 H2O. A.R.H.

N82-20003# Technische Hogeschool, Eindhoven (Netherlands).
THE ANISOTROPIC CLASSICAL CHAIN. THERMODYNAMIC PROPERTIES AND PHASE DIAGRAMS Ph.D. Thesis
Frans Boersma 3 Feb. 1981 135 p refs
Avail: NTIS HC A07/MF A01

The Hamiltonian for the classical model of a one dimensional system containing orthorhombic anisotropy in an external magnetic field is defined, the transfer matrix formalism and the theory of the eigenvalue problem are discussed, and the accuracy of the numerical approach presented is evaluated. Magnetic response functions, correlations, and other thermodynamic variables are considered and experimental results are examined. The chemical and magnetic properties of quasi-one dimensional manganese compounds built up of more or less linear chains of Mn (++) ions were determined and phase diagrams plotted. It is shown that the classical model including orthorhombic anisotropy describes the experimental phase diagrams correctly for all three directions of the magnetic field. A.R.H.

N82-20004# Technische Hogeschool, Delft (Netherlands).
SOME ASPECTS OF TWO-PHASE FLOW, HEAT TRANSFER AND DYNAMIC INSTABILITIES IN MEDIUM AND HIGH PRESSURE STEAM GENERATORS Ph.D. Thesis
Huseyin Cetin Unal 18 Mar. 1981 249 p refs
Avail: NTIS HC A11/MF A01

Experimental data for void fraction, incipient point of boiling, initial point of net vapor generation, bubble dynamics, dryout, two-phase flow pressure drop and density-wave oscillations were obtained in long, sodium heated steam generator tubes of different geometries for a wide range of operating conditions and at medium and high pressures. These data and data from literature taken in sodium and electrically heated steam generator tubes were correlated. Aspects of two-phase flow, heat transfer and density-wave oscillations in these steam generators disclosed include the distribution factor in small- and medium-size diameter steam generator tubes, the characteristic of the transitions at the incipient point of boiling and initial point of net vapor generation, bubble growth during subcooled nucleate flow boiling, the importance of the equivalent length for dryout in non-uniformly heated steam generator tubes and the mechanisms of density-wave oscillations in once-through steam generator tubes. A.R.H.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-20005*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
AN INVESTIGATION OF THE LAG BETWEEN THE START OF RESEARCH AND THE DEVELOPMENT OF NEW TECHNOLOGY Final Report
Steven E. Glass Feb. 1982 31 p refs
(Contract NASw-3204)
(NASA-CR-168583; Rept-40) Avail: NTIS HC A03/MF A01 CSCL 05A

The lag which occurs between the start of NASA-sponsored research and the development of new technology is addressed. A possible common gestation period is examined. The lags vary from one to zero years. The observed lag as it relates to patent applications is shorter than the lag as it relates to invention disclosures. The sequential hypothesis testing showed that invention disclosures correlated better to the measures of research effort used then did patent applications. N.W.

N82-20006*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOCAL AND NATIONAL IMPACT OF AEROSPACE

RESEARCH AND TECHNOLOGY
John F. McCarthy, Jr. Dec. 1981 10 p refs Presented at Cleveland City Club, Ohio, 4 Dec. 1981
(NASA-TM-82775; E-1106) Avail: NTIS HC A02/MF A01 CSCL 05A

An overview of work at the NASA Lewis Research Center in the areas of aeronautics space, and energy is presented. Local and national impact of the work is discussed. Some aspects of the U.S. research and technology base, the aerospace industry, and foreign competition are discussed. In conclusion, U.S. research and technology programs are cited as vital to U.S. economic health. Author

N82-20007# Helsinki Univ. of Technology, Espoo (Finland). Lab. of Information Processing Science.
AN APPROACH FOR GROSS DESIGN OF OPERATIONS MANAGEMENT SYSTEMS Ph.D. Thesis
Eero Eloranta 1981 120 p refs
(ISBN-951-752-308-4; ISSN-0356-5068) Avail: NTIS HC A06/MF A01

The control aspect of management systems is studied. Subtasks of management planning, directing and montoring are closely related to those of control, defined as recepting, effecting and informing or sensing, selecting and effecting. Management is considered the control of an organization by one of more of its parts. The redesign of management systems implies an improvement in effectiveness or in efficiency, measured of just estimated by tangible or intangible benefits. Effectiveness is to do the right thing while efficiency is to do the thing right. A change in effectiveness rather than a change in efficiency is emphasized. The very first stage of the design process start from a vague problem identification and end at a project proposal for detailed design of improvement. The gross design of operations management systems is introduced. S.L.

N82-20008# General Electric Co., Santa Barbara, Calif. Center for Advance Studies.
PLANNING STUDY TO ESTABLISH DOD MANUFACTURING TECHNOLOGY INFORMATION ANALYSIS CENTER Final Technical Report, May 1980 - Jan. 1981
Jan. 1981 191 p refs
(Contract DAAG46-80-C-0026)
(AD-A108925; GE80TMP-43) Avail: NTIS HC A09/MF A01 CSCL 05/1

Based on the results of the planning study, it is recommended that the DoD sponsor and initiate administrative procedures to establish an MTIAC within 2 years with the mission of improving the diffusion of DoD Manufacturing Technology (MT) program results by serving as a focal point between defense-related industries and the Military Services. It is also recommended that the MTIAC be: (1) Operated and staffed by one of several qualified nongovernment, DoD contractor organizations; (2) Administered by DLA and technically monitored by a Military Services agency such as AMMRC; and (3) Initially funded (by OSD and the Military Services) at an annual level ranging from $400,000 to $700,000 with a growth not to exceed $1,000,000 in 5 years. GRA

N82-20009# Texas Univ. at Arlington. Center for Cybernetics Studies.
AN MDI MODEL AND AN ALGORITHM FOR COMPOSITE HYPOTHESES TESTING AND ESTIMATION IN MARKETING
A. Charnes, W. W. Cooper, D. B. Leaner (Market Research Corp. of America), and F. Y. Phillips (Market Research Corp. of America) Sep. 1981 33 p refs Prepared in cooperation with Carnegie-Mellon Univ.
(Contracts N00014-81-C-0236; N00014-81-C-0410; NR Proj. 047-021)
(AD-A109147; CCS-397) Avail: NTIS HC A03/MF A01 CSCL 05/1

A strategy is provided for using constrained versions of the MDI (minimum discrimination information) statistic to test and estimate market relations involving composite hypotheses. An algorithm for applying the tests and effecting the estimates is also provided along with numerical illustrations. Other, more general, developments in statistics and mathematical programming (duality) theories and methods are also briefly discussed for their possible bearing on further uses in marketing research and management. Author (GRA)

N82-20010# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
IMPROVING COMMUNICATION IN ORGANIZATION OPERATION: PREPARING COMMUNICATION RESOURCES IN A LARGE ENTERPRISE [VERBESSERN DER KOMMUNIKATION IN DER BETRIEBSORGANISATION - EINSATZ VON KOMMUNIKATIONSMITTELN IN EINEM GROSSUNTERNEHMEN]
W. Bochnig 1981 6 p refs Reprint from VDI-Berichte, no. 404, 1981 p 11-13 In GERMAN
(MBB-BB-499-81-O) Avail: NTIS HC A02/MF A01

The adaptation of a large organization to the increasing use of communication methods is discussed. It is shown that with the right use of modern means of communication considerable cost reduction and time saving can be accomplished. The profit an organization can make through acceleration of information, especially when communication is a condition for production success is enumerated. Transl. by E.A.K.

N82-20011# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
TRANSFER OF AEROSPACE PROJECT MANAGEMENT TO THE DEVELOPMENT OF TECHNICAL SERIES PRODUCTION [NUTZUNG DES PROJEKT-MANAGEMENTS AUS DER RAUMFAHRT FUER DIE ENTWICKLUNG TECHNISCHER SERIENPRODUKTE]
B. Madauss 1981 47 p Partly in GERMAN and ENGLISH Presented at Battelle-Inst. Conf. on Management von Entwicklungsprojekten, Frankfurt, 26-27 Mar., 1981
(MBB-UR-482-81-O) Avail: NTIS HC A03/MF A01

The application of aerospace management techniques to commercial systems management was examined. To establish criticality and sequence of action the following measures are outlined: identification of most critical problems; layout of a complete plan for everything; identify placing elements. Aerospace management techniques are cited: decision analysis, technological forecasting, system engineering management, reliability analysis, value engineering, management information systems, and quality assurance. Transl. by E.A.K.

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-20012*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MODELING THE DATA SYSTEMS ROLE OF THE SCIENTIST (FOR THE NEEDS COMMAND AND CONTROL TASK)
Donald J. Hei, Jr., William J. Winter, Jr. (Sigma Data Services Corp.), Robert Brookes (Sigma Data Services Corp.), and Maureen Locke (Sigma Data Services Corp.) Sep. 1981 75 p
(NASA-TM-84028; NSSDC/WDC-A-R&S-81-04) Avail: NTIS HC A04/MF A01 CSCL 05B

Research was conducted into the command and control activities of the scientists for five space missions: International Ultraviolet Explorer, Solar Maximum Mission, International Sun-Earth Explorer, High-Energy Astronomy Observatory 1, and Atmospheric Explorer 5. A basis for developing a generalized description of the scientists' activities was obtained. Because of this characteristic, it was decided that a series of flowcharts would be used. This set of flowcharts constitutes a model of the scientists' activities within the total data system. The model was developed through three levels of detail. The first is general and provides a conceptual framework for discussing the system. The second identifies major functions and should provide a fundamental understanding of the scientists' command and control activities. The third level expands the major functions into a more detailed description. N.W.

N82-20013# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
METHODS OF IMAGE COMPRESSION WITHOUT INFORMATION LOSS [METODOS DE COMPRESSAO DE IMAGENS SEM PERDA DE INFORMACAO]
Orion deOliveira Silva Nov. 1981 21 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Natl. Congr. on Appl. and Computational Math., Rio de Janeiro, 8-11 Sep. 1981 Submitted for publication
(INPE-2274-PRE/054) Avail: NTIS HC A02/MF A01

Large programs, large blocks of text, and a wide variety of data bases can now be stored and retrieved by computers. While the storage cost has been dropping continuously, the need for compression techniques for saving memory space still exists. Several digital image compression methods that avoid information loss are presented. Details about the algorithm implementation are given, and comparative results derived from their application to remote sensing and meteorological satellite imagery. N.W.

N82-20014# Booz-Allen and Hamilton, Inc., New York.
COST DATA BASE DEVELOPMENT: A TWELVE-YEAR PERSPECTIVE
Anthony C. Leggitt 7 Oct. 1981 14 p Presented at the 16th Ann. DOD Cost Anal. Symp., Arlington, Va., 4-7 Oct. 1981
(AD-A109371) Avail: NTIS HC A02/MF A01 CSCL 05/2

We have a way to go in compiling the data needed to accomplish various cost estimating and analysis tasks. Data currently exists to answer most questions that arise and that for the most part it is partitionable to the extent required for particular applications. The real issue is one of obtaining the data in a timely manner and of reducing the redundant data collection effort needed every time a cost effectiveness question arises in the decision making arena. GRA

N82-20015# Naval Postgraduate School, Monterey, Calif.
SASS HARDWARE ARCHITECTURE AND DEVELOPMENT MONITOR
Gary Stewart Baker Jun. 1981 278 p refs
(AD-A109552; NPS52-81-016) Avail: NTIS HC A13/MF A01 CSCL 09/2

This report contains the documentation for the Secure Archival Storage System hardware architecture, developmental monitor program, amd all necessary support programs to effect programming of the firmware. Author (GRA)

N82-20016# Naval Postgraduate School, Monterey, Calif.
THE NAVAL POSTGRADUATE SCHOOL SECURE ARCHIVAL STORAGE SYSTEM. PART 2: SEGMENT AND PROCESS MANAGEMENT IMPLEMENTATION
Lyle A. Cox, Roger R. Schell, and Sonja I. Perdue Mar. 1981 451 p refs
(RR0000110)
(AD-A109553; NPS52-81-001) Avail: NTIS HC A20/MF A01 CSCL 09/2

The security kernel technology has provided the technical foundation for highly reliable protection of computerized information. However, the operating system implementations face two significant challenges: providing (1) adequate computational resources for applications tasks, and (2) a clean, straightforward structure whose correctness can be easily reviewed. This paper presents the experience on an ongoing security kernel implementation using the Advanced Micro Devices 4116 single-board computer based on the Z8002 microprocessor. The performance issues of process switching, domain changing, and multiprocessor bus contention are explicitly addressed. The strictly hierarchical (i.e., loop-free) structure provides a series of increasingly capable, separately usable operating system subsets. Security enforcement is structured in two layers: the basic kernel rigorously enforces a non-discretionary (viz., lattice model) policy, while an upper layer provides the access refinements for a discretionary policy. Author (GRA)

N82-20017# European Space Agency, Paris (France).
CATALOGUE OF ESA PUBLICATIONS IN 1980
Jacqui Miort, comp. May 1981 20 p refs
(ESA-SP-1037) Avail: NTIS HC A02/MF A01

Approximately 140 publications concerning aeronautics, astronautics, chemistry, engineering, geosciences, life sciences, mathematics, space sciences, physics, social sciences, and computer science are listed. Details of contractor reports are given. Author (ESA)

N82-20018# Intermountain Forest and Range Experiment Station, Ogden, Utah.
FORMATTING AND DOCUMENTING MULTIDISCIPLINARY DATA Forest Service Research Note
Joyce A. Schlieter Aug. 1981 6 p refs
(PB82-122862; FSRN/INT-317) Avail: NTIS HC A02/MF A01 CSCL 05B

The management of data accumulated during the course of a 5 year multidisciplinary research program is discussed. A system developed for organizing collected data is described and a reference sheet, designed to identify and facilitate data access, is shown. GRA

N82-20019# Physical Research Lab., Ahmedabad (India).
THE PERIODICAL MANAGEMENT SYSTEM
D. R. Kulkarni, R. R. Bharucha, and U. A. Ghiya 1980 42 p
(PB82-116518; PRL/TN-80-02) Avail: NTIS HC A03/MF A01 CSCL 05B

A computerized Periodical Management System was developed and implemented for the Library of the Physical Reseach Laboratory. The system monitors various procedures related to procurement of periodicals. It also processes the information related to periodicals and presents it in the form of comprehensive reports. Thus the system leads to better management of periodicals as well as better service to the users. The system was made operational on the Computer System IBM 360/44 under the operating system 44 PS. GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-20020# European Space Agency, Paris (France).
THE ECONOMIC IMPACT OF AN OPERATIONAL EUROPEAN METEOROLOGICAL SATELLITE PROGRAM IN THE 1980'S
W. R. Burke, ed. and N. Longdon, ed. Dec. 1980 28 p Prepared by Eurosat S.A. Original contains color illustrations
(ESA-BR-03; ISSN-0250-1589) Avail: NTIS HC A03/MF A01

The Meteosat program is reviewed and the cost/benefit ratios of a European Meteosat type network are extrapolated for the period 1979 to 1990, based on Meteosat costs. Only those benefits accruing from the improvement of conventional meteorological products are considered. Taking inflation rates and growth in gross domestic product into account, the effects on all major sectors of economic activity are reviewed and the impact on all the countries in the Meteosat coverage zone is assessed. Benefits are conservatively estimated at three times the corresponding expenditure. Author (ESA)

N82-20021# Interior Dept., Washington, D.C. Office of Minerals Policy and Research Analysis.
COBALT: EFFECTIVENESS OF ALTERNATIVE US POLICIES TO REDUCE THE COSTS OF A SUPPLY DISRUPTION
Elizabeth Abbe, Robert Adams, Julius Chang, Thomas Doyle, Ron Hurdelbri, Stan Miller, David Quick, and Ted Tupper Aug. 1981 100 p
(PB82-110560; DOI/OMPRA-81/01) Avail: NTIS HC A05/MF A01 CSCL 05C

During the 1980-90 period there is a low probability of a severe disruption in cobalt exports from Zaire and Zambia and a high probability of several smaller disruptions in 1985 and 1986. Since cobalt has few good substitutes and often constitutes a small proportion of the total cost of a product, large cobalt price increases do not result in significant losses in consumption. Effective U.S. policies tend to be supply oriented and stockpile oriented rather than demand oriented. The effectiveness of tested policies depends on the timing, costs and severity of the supply disruption expected. The maximum social cost to the United

States of a cobalt supply disruption is estimated based on a market analysis and on an interindustry model. Strategic Stockpile releases alone or in combination with a domestic production price guarantee are an effective policy for moderating economic impacts for all disruptions analyzed. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-20022*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

FUTURE FUELS AND ENGINES FOR RAILROAD LOCOMOTIVES. VOLUME 1: SUMMARY

S. G. Liddle, B. B. Bonzo, G. P. Purohit, and J. A. Stallkamp 1 Nov. 1981 41 p

(Contracts NAS7-100; DE-AI01-78CS-55151)

(NASA-CR-168642; JPL-Pub-81-101-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 13F

The potential for reducing the dependence of railroads on petroleum fuel, particularly Diesel No. 2 was investigated. Two approaches are studied: (1) to determine how the use of Diesel No. 2 can be reduced through increased efficiency and conservation, and (2) to use fuels other than Diesel No. 2 both in Diesel and other types of engines. Because synthetic hydrocarbon fuels are particularly suited to medium speed diesel engines, the first commercial application of these fuels may be by the railroad industry. B.W.

N82-20023# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

MODELS OF PROJECTION AND LOCALIZATION OF URBAN POPULATION USING SIMULATION TECHNIQUES

Maria Suelena Santiago Barros, Damaceno Dal Bianco, and Odwaldo Bueno Netto, Jr. Aug. 1981 25 p refs In PORTUGUESE; ENGLISH summary Presented at 33d Ann. Meeting of SBPC, Salvador, 8-15 Jul. 1981

(INPE-2207-PRE/013) Avail: NTIS HC A02/MF A01

A method for the projection and location of urban population is presented using multivariate simulation of the supply and demand of urban space, applying Monte Carlo technique. The calibration of this model is attained by stratified sampling in homogeneous occupation zones, defined through remote sensing, from which results a considerable reduction of the sample size for the same precision and confidence level. The total future population of the city is an exogenous variable, which is then distributed through simulation over the urban area. Addressing the demand for urban space the model proceeds to reproduce the households' site selection process through simulation of the decision variables values in the following sequence: income, construction standards and the neighborhood urbanization level. Author

N82-20024# Commerce Dept., Washington, D.C. Patent and Trademark Office.

TECHNOLOGY ASSESSMENT AND FORECAST REPORT, 10TH

Nov. 1981 175 p

(Rept-10) Avail: NTIS HC A08/MF A01

Patent and Trademark Office subclasses that are very active or predominantly of foreign origin are examined as an aid to identifying technologies having such characteristics. The 50 most active subclasses in chemical, electrical, and mechanical disciplines are presented showing highest growth, highest growth rate, and highest foreign resident inventor share. The influence in the U.S. technology market of five European and five Japanese corporations owning and/or controlling the most U.S. Patents for the period 1969-1980 is assessed. Patenting in computer software related technologies is analyzed with focus on the present status of the law in this field and the effects of laws on seismic data processing. Applications for and patents granted in aerospace technology are discussed with particular emphasis on the uses of patent information for historical review, as a research tool, and as a bibliographical data source. A.R.H.

N82-20025# National Research Council of Canada, Ottawa (Ontario). Div. of Mechanical Engneering.

URBAN TRAFFIC SIGNAL CONTROL FOR FUEL ECONOMY. PART 2: EXTENSION TO SMALL CARS

G. S. Messenger Nov. 1981 13 p refs

(AD-A109393; DME-ME-249; NRC-19846) Avail: NTIS HC A02/MF A01 CSCL 13/6

Use of a small car's characteristics in a simulation program utilizing velocity profiles obtained in a traffic study by the Metropolitan Toronto Roads and Traffic Department and the Engine Laboratory at the National Research Council Canada has shown that trends shown in fuel consumption in NRC, Division of Mechanical Engineering Report No. ME-247 are similar for a small-engined vehicle. NRC, DME Report No. ME-247 showed that under the TRANSYT timing plan vehicles encountered fewer stops, saved time and used a slightly smaller amount of fuel than under the existing timing plan. In the above mentioned report, a large vehicle's fuel consumption was calculated using a computer model of the vehicle which used velocity profiles obtained from an instrumented floating car. GRA

N82-20026# Sheffield Univ. (England). Dept. of Control Engineering.

WARD-LEONARD CHARACTERISTICS FROM NONLINEARLY-CONTROLLED SERIES MOTOR DRIVES

J. B. Edwards, K. Pacey (Chloride Legg Ltd., Wolverhampton, England), and T. A. Al-Fileyeh Nov. 1981 29 p refs Submitted for publication

(RR-165) Avail: NTIS HC A03/MF A01

Improving the maneuverability of fork lift trucks driven by chopper controlled series motors is discussed. Computerized simulation shows nonlinear feedforward cancellation of one system state (speed) to be unstable. Analytical solution of the system equations confirms this. The instability results from neglect of field inductive effects in the feedforward model. Simulation shows that a method which employs synthesized torque and transient velocity estimates derived purely from armature current feedback is highly tolerant of uncertainty in the vehicle and drive parameter estimates. It produces overall control characteristics resembling those of Ward-Leonard drives. The manual handling of the truck on a variable gradient test track shows a considerable improvement on conventional linear current control systems. Author (ESA)

N82-20027# Market Facts, Inc., Arlington, Va. Public Sector Research Group.

CONSUMER BEHAVIOR TOWARDS FUEL EFFICIENT VEHICLES. VOLUME 1: EXECUTIVE SUMMARY Final Report Oct. 1977 - Mar. 1981

James T. Heisler and Sid Groeneman Mar. 1981 22 p

(Contract DOT-HS-7-01781)

(PB82-103300; DOT-HS-805936) Avail: NTIS HC A02/MF A01 CSCL 10A

Information on likely market response to various vehicle design and performance collected to minimize the possibility of market rejection is discussed. Group discussion and consumer experiments with drivers in different vehicle size classes were used. Analysis focuses on the believability of the energy crisis and concern about its effects, the acceptability of possible fuel economy options, consumer preference with respect to vehicles embodying selected design and engineering changes, and predicted purchase and usage patterns under different future scenarios. GRA

N82-20028# Transport and Road Research Lab., Crowthorne (England). Vehicle Safety Div.
BRAKING FORCE COEFFICIENTS OF WORN TYRES
A. R. Williams, V. E. Davies, B. S. Riley, and H. A. Wilkins 1981 18 p refs
(PB82-122698; TRRL-Supplementary-672; ISSN-0305-1315) Copyright. Avail: NTIS HC A02/MF A01 CSCL 13F

Car tires become worn in practice evenly, with one shoulder wear, with double shoulder wear, or with center wear. Peak and locked wheel brake force coefficients were measured for both new tires and those worn in these various ways. The tests were done on two research track surfaces representing the extremes of rough and smooth surfaces likely to be found on roads. Speeds ranging from 30 km/h to 125 km/h were used. GRA

N82-20029# Systems Applications, Inc., San Rafael, Calif.
APPLICATION OF THE EMPIRICAL KINETIC MODELING APPROACH TO URBAN AREAS. VOLUME 2: TULSA
G. Z. Whitten, H. Hogo, and S. D. Reynolds Research Triangle Park, N.C. EPA May 1981 194 p refs
(Contract EPA-68-02-3376)
(PB82-114224; Rept-49B-81-EF-81-116;
EPA-450/4-81-0058) Avail: NTIS HC A09/MF A01 CSCL 13B

The EKMA was evaluated using applications in the Tulsa area primarily by comparing the trajectory model that forms the basis of the EKMA (OZIPP) with other more sophisticated models. The study was carried out at several levels, beginning with evaluation of OZIPP and ending with an evaluation of the control strategy predictions that result from employing the EKMA isopleth methodology. The OZIPP trajectory model was compared with the SAI airshed model and the SAI trajectory model, as well as with some modified versions of the original OZIPP model. The basic OZIPP model is a simple moving air parcel, or trajectory, model that uses a detailed chemical mechanism for the surrogate propylene and butane hydrocarbons. GRA

88 SPACE SCIENCES (GENERAL)

N82-20030# European Space Agency, Paris (France).
PLASMA ASTROPHYSICS
T. D. Guyenne, ed. and G. Levy, ed. Nov. 1981 571 p refs Proceedings of Intern. School of Plasma Phys. Course and Workshop, Varenna, Italy, 27 Aug. - 7 Sep. 1981; sponsored by CNR, CNES, ESA, Milan Univ., Regione Lombardia, Italy, Camera di Commercio di Como, Italy, Cassa di Risparmio delle Provincie Lombarde, Italy and Gilardoni S.p.A.
(ESA-SP-161; ISSN-0379-6566) Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Plasmas in the universe, plasma processes, the Sun and heliosphere, and galaxies and radiogalaxies are discussed. X-ray astronomy and the physics of collapsed objects are covered. Other subjects treated are particle acceleration, accretion, collective phenomena, and cosmic rays. The correlation between plasma physics and astrophysics as well as solar and interplanetary processes were also dealt with. For individual titles, see N82-20031 through N82-20086.

N82-20031# California State Univ., San Diego.
THE NEW PARADIGM IN COSMIC PLASMA PHYSICS **c90**
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 3-10 Sponsored in cooperation with Royal Inst. of Tech., Stockholm (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A transition in accepted cosmic theory from a magnetic field description to an electric current description is propounded. The change in paradigm in cosmic plasma physics was surveyed. Particle description often gives a better picture than a hydromagnetic one. A frozen-in field line model is sometimes useful, although often erroneous because of boundary condition mistakes. The inhomogeneous structure (cellular structure) of space plasmas is emphasized in opposition to homogeneous models. Electric circuits offer a good first approximation. While the evolution of the solar system continues to be explained almost exclusively by mechanical forces, plasma effects seem essential for the formation and evolution of interstellar clouds, for band structure, and for cosmogonic shadow effects. Author (ESA)

N82-20032# Royal Inst. of Tech., Stockholm (Sweden).
THE VOYAGER 1 SATURN ENCOUNTER AND THE COSMOGONIC SHADOW EFFECT **c91**
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 11-21 refs Prepared in cooperation with California State Univ., San Diego (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The cosmogonic shadow effect is described, considering charged particles (electrons, ions, charged dust) in an axisymmetric dipole field around a gravitating, rotating body. The medium is two-thirds supported by centrifugal force and one-third by electromagnetic forces under the condition that the magnetic field is strong enough to control the motion. If the electromagnetic forces disappear, e.g., by deionization of the dusty plasma, the medium contracts to two-thirds its original central distance. The Voyager 1 Saturn results demonstrate that the macrostructure of the Saturnian ring system can be explained as a result of this effect at the formation of the system. A similar analysis of the asteroidal belt shows that its macrostructure can also be explained by the cosmogonic shadow effect. The observational results show that during their formation both the Saturnian rings and the asteroidal belt passed a plasma state dominated by electromagnetic effects. Author (ESA)

N82-20033# Chicago Univ., Ill. Dept. of Physics.
THE MAGNETOHYDRODYNAMIC DYNAMO **c90**
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 23-29 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A mechanism for the maintenance of the magnetic fields of planets, stars, and galaxies is postulated. It appears that cyclonic convection and nonuniform rotation within the liquid metal cores of planets, the convective zones of stars, and the gaseous disks of galaxies provide an efficient dynamo mechanism for the production of these fields. The dominant field within the body is azimuthal, produced by nonuniform rotation from the poloidal field. The interaction of cyclonic convection within the azimuthal field produces loops of flux in meridional planes whose net effect is a meridional circulation of field in the same sense as the original poloidal field. Both stationary and oscillatory fields can be generated in this way. Author (ESA)

N82-20034# Chicago Univ., Ill. Dept. of Physics.
THE NONEQUILIBRIUM OF MAGNETIC FIELDS **c90**
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 31-35 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The more subtle properties of magnetic fields which create nonequilibrium and lead to vigorous activity in otherwise sluggish gas-field systems are evaluated for gross hydromagnetic effects. The gentle manipulation of magnetic fields on a large scale leads to the production of small scale variations and discontinuities, providing intense dissipation of magnetic field in a large scale system. A magnetic field embedded in a conducting fluid possesses a static equilibrium only if the topology of the lines of force is suitably invariant along the direction of the field. When the field does not possess the necessary invariance, it is subject to internal neutral point reconnection. The magnetic fields of most stars suffer such nonequilibrium, and consequent enhanced dissipation, providing an important source of heat in their outer atmospheres. Author (ESA)

N82-20035# Nagoya Univ. (Japan). Dept. of Astrophysics.
INTERSTELLAR MATTER **c90**
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 37-42 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Several components of the interstellar medium were demonstrated to coexist by thermal balance and/or pressure balance. The two phase stability is explained by the temperature and density dependencies of the heating and cooling rates. Cooling rates are given for a thin hot plasma under ionization equilibrium for the interstellar media of solar abundances and of metal depleted abundances. Thermal instabilities are discussed with regard to the temperature dependence of the cooling rate. A deviation from ionization equilibrium and from electron-ion equipartition may take place in a tenuous plasma. Numerical examples of the nonsteady behavior are shown. The generation of a hot plasma by supernova blast waves is discussed on the basis of evolution models of the supernova remnant. Obervational results, indicating the distribution of the hot plasma component are presented in reference to soft X-ray and nonthermal radio maps. Author (ESA)

N82-20036# Oxford Univ. (England). Magdalen College.

MODULATIONAL INSTABILITIES IN ASTROPHYSICS c75

D. terHaar *In* ESA Plasma Astrophys. Nov. 1981 p 45-49 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The occurrence of modulational instabilities in an isotropic, unmagnetized plasma is discussed and an extension of the theory to magnetized plasmas is considered. The basic equations were derived, following a two fluid description of the plasma. Application to the theory of type 1 solar bursts is proposed. Type 3 solar bursts, auroral kilometric radiation, and pulsar radiation are also dealt with. Galactic density waves are another manifestation of modulational instabilities in astrophysics. Author (ESA)

N82-20037# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.

STABILITY OF THE EQUILIBRIUM STATES OF THE INTERSTELLAR GAS AND FIELD SYSTEM c90

Catherine J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 51-59 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Possible static equilibrium configurations of the interstellar gas-fields system (including cosmic rays) are described and were tested for stability. The simplest equilibrium configurations, with horizontal magnetic fields and with equal scale heights for the three components (stratified equilibrium), are unstable if the polytropic index of the gas is larger than a critical value. The perturbations that grow most rapidly have wavelengths equivalent to several 100 parsecs along the field and very short wavelengths across the field. The stability of two dimensional curved equilibria, where the magnetic field lines lie in planes orthogonal to the galactic plane, can be tested using the MHD energy principle. It is found that any state connected through flux freezing with an initially unstable horizontal state is also unstable to perturbations with a short transverse wavelength. Author (ESA)

N82-20038# Academy of Sciences (USSR), Moscow. Inst. of Physics.

PLASMA EMISSION MECHANISMS AND ACCELERATION OF RELATIVISTIC PARTICLES IN COSMIC PLASMAS c90

V. N. Tsytovich *In* ESA Plasma Astrophys. Nov. 1981 p 61-75 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Recent theory in plasma physics was reviewed, and the emission mechanism for relativistic particles in space was analyzed. The difference between the synchrotron emission mechanism and emission in random small-scale magnetic fields is clarified. It is emphasized that often in space, relativistic particles have a power-law energy distribution. Cosmic emission also has a power-law frequency dependence. For a synchrotron emission mechanism, there exists a universal relation between gamma and mu, i.e., mu = 1/2 (gamma - 1). Whether this relation is indeed universal is discussed. Results show under which circumstances the relation is not valid and what kind of relation should be used in the case of relativistic particle emission, e.g., in a small-scale random field or in strong turbulence. Author (ESA)

N82-20039# Academy of Sciences (USSR), Moscow. Inst. of Space Research.

WEAK TURBULENCE THEORY OF ENHANCED GAS IONIZATION BY PLASMA FLOW c75

A. A. Galeev *In* ESA Plasma Astrophys. Nov. 1981 p 77-82 refs (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A quasilinear theory of collisionless energy transfer from a counterstreaming plasma-gas flow to electrons is presented. The critical ionization velocity was reexamined. It is recognized that this phenomenon requires enhanced heating of electrons, via some hypothetical collisionless interaction between plasma species, that can be studied by a well developed weak plasma turbulence theory. Since a plasma cannot interact collisionlessly with a neutral gas, it is assumed that, in astrophysical situations, some seed ionized atoms are produced in the plasma flow by external ionization sources, e.g., stellar ultraviolet radiation. The orbits of newly ionized atoms are such that they form an unstable distribution in a velocity space. Although the branch of plasma modes excited by an instability is the same in a wide range of plasma and field parameters, the driving term has a different form in two limiting cases, which are considered. Author (ESA)

N82-20040# Princeton Univ., N. J.

IDEAL MHD FLUIDS c75

Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 83-87 (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN and NO (+20% others)

The general properties of the fluids are discussed. In particular, the definition and significance of flux freezing is emphasized. Energy conservation was demonstrated and its importance for plasma motion and equilibrium is shown. These concepts are illustrated by a model of magnetic fields above the solar photosphere. Author (ESA)

N82-20041*# Maryland Univ., College Park. Dept. of Physics and Astronomy.

PLASMA LASERS (A STRONG SOURCE OF COHERENT RADIATION IN ASTROPHYSICS) c36

K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 89-95 refs (For primary document see N82-20030 10-88)

(Contracts NAGw-81; N00014-79-C-0665)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20E

The generation of electromagnetic radiation from the free energy available in electron streams is discussed. The fundamental principles involved in a particular class of coherent plasma radiation sources, i.e., plasma lasers, are reviewed, focusing on three wave coupling, nonlinear parametric instabilities, and negative energy waves. The simplest case of plasma lasers, that of an unmagnetized plasma containing a finite level of density fluctuations and electrons streaming with respect to the ions, is dealt with. A much more complicated application of plasma lasers to the case of auroral kilometric radiation is then examined. The concept of free electron lasers, including the role of relativistic scattering, is elucidated. Important problems involving the escape of the excited radiation from its generation region, effects due to plasma shielding and nonlinear limits, are brought out. Author (ESA)

N82-20042# Rome Univ. (Italy). Ist. Astronomico.

RADIATION PROCESSES IN ACTIVE GALACTIC NUCLEI c93

A. Cavaliere *In* ESA Plasma Astrophys. Nov. 1981 p 97-103 refs Sponsored by CNR (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The peculiar conditions of the plasma filling the emission regions of the powerful continuum radiation from active galactic nuclei and quasars are discussed. The plasma is energized by gravitation; it is radiation dominated, out of thermal equilibrium, at least weakly relativistic, and it is likely to comprise a large

number of positrons. Specific tenets of plasma physics are called into question. Author (ESA)

N82-20043# Princeton Univ., N. J. Dept. of Astrophysical Sciences.

PARTICLE ACCELERATION c93

Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 105-109 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The general theory of particle acceleration is illustrated by three particular types of acceleration. These are Fermi acceleration, acceleration by strong electromagnetic waves such as those assumed to be produced by pulsars, and acceleration by collisionless shocks. The physical processes involved as well as the amount of acceleration produced in each case are discussed. Fermi acceleration is entirely stochastic. Pulsar acceleration is entirely coherent. Shock acceleration is a mixture of the two in which stochastic acceleration is organized by the shock in such a way as to yield a good power spectrum. Author (ESA)

N82-20044# Utrecht State Univ. (Netherlands). Inst. of Astronomy.

HEATING PROCESSES OF THE SOLAR CORONA c92

M. Kuperus *In* ESA Plasma Astrophys. Nov. 1981 p 113-128 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Coronal heating processes are discussed in the context of the magnetic structure of the solar corona. Existing theories are divided into acoustic theories, where the magnetic field plays a passive role, and electrodynamic theories where the magnetic field plays an active role in the sense that transversal waves are possible. The dissipation mechanisms are shock wave dissipation in the acoustic theory and viscous and Joule dissipation of Alfven waves in the electrodynamic theory. The dissipation of Alfven waves appears to be much more effective in a structured medium than in a homogeneous medium. Anomalous Joule heating is likely to be important as a steady heating mechanism. Author (ESA)

N82-20045*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

PLASMA DYNAMICS IN THE RAPIDLY ROTATING MAGNETOSPHERE OF JUPITER c91

John W. Belcher *In* ESA Plasma Astrophys. Nov. 1981 p 129-134 refs (For primary document see N82-20030 10-88) (Contract JPL-953733; Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

The major Voyager findings concerning the low energy plasma in the Jovian magnetosphere are reviewed. The magnetosphere of Jupiter is unique in the solar system because of its large extent and rapid rotation, and because of the prodigious source of plasma provided by the satellite Io. Io injects > 10 to the 29th power AMU/sec of freshly ionized material into the Jovian magnetosphere, producing a plasma dominated by heavy ions which are mostly various ionization states of oxygen and sulfur. This injected material is the source for the Io plasma torus, which is centered at Io's L-shell with a scale height of 1 Jovian radii and a mass of approximately 10 to the 36th power AMU. Ninety percent of the injected plasma diffuses outward, forming the Jovian magnetodisk. Io interacts with the plasma torus via the generation of an Alfven wave which propagates from Io into the ionosphere of Jupiter, carrying an energy flux of approximately 10 to the 12th power watts. Author (ESA)

N82-20046*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

INFERENCES ABOUT THE SOLAR WIND DYNAMICS FROM OBSERVED DISTRIBUTIONS OF ELECTRONS AND IONS c92

Stanislaw Olbert *In* ESA Plasma Astrophys. Nov. 1981 p 135-143 refs (For primary document see N82-20030 10-88) (Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+ 20% others) CSCL 03B

Recent measurements, mostly from Helios and Voyager, were reviewed. The observational material was compiled into a series of radial profiles for various macroscopic plasma parameters. Several examples for experimentally determined three-dimensional distribution functions of protons are shown. The physical properties of the solar wind electrons were surveyed. The still unresolved question of the driving mechanism of the solar wind is considered. The problem of the energy balance in pure, high velocity streams emanating from solar coronal holes was outlined. It is suggested that the suprathermal electrons may play an important role in driving the wind. Numerical estimates, referring to the lower corona, are offered in support of this hypothesis. Author (ESA)

N82-20047# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.

PLASMA PROCESSES AT COLLISIONLESS SHOCK WAVES c75

V. Formisano *In* ESA Plasma Astrophys. Nov. 1981 p 145-165 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The importance of the curvature of the Earth bow shock surface for particle acceleration is discussed. Plasma quantities at collisionless shock waves obey the generalized Rankine-Hugoniot relations. Four parameters are considered: the magnetosonic Mach number, the angle between the shock normal and the upstream magnetic field direction, the ratio of particle pressure to magnetic pressure, and the electron to ion temperature ratio. At low Mach number ($M < or = 3$), the shock is resistive. Between $M = 3$ and $M = 5$, viscosity is needed to dissipate the solar wind energy. Above $M = 5$, ion gyration becomes important with the dissipation length on the order of one or several ion gyroradii. Both electromagnetic and electrostatic turbulence were observed. Two processes for accelerating particles seem to be working at the Earth bow shock: one based essentially on the electric field tangent to the shock seen by particles trying to move upstream; the other working on particles already accelerated with the previous mechanism, being a Fermi-like mechanism and operating in front of quasi-parallel shocks. Author (ESA)

N82-20048# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.

THE INTERNATIONAL SOLAR POLAR MISSION (ISPM) c92

R. G. Marsden and K.-P. Wenzel *In* ESA Plasma Astrophys. Nov. 1981 p167-175 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The scientific objectives of the instrumentation chosen to carry out the exploratory investigations of ISPM are reviewed, including mission time-lines and trajectory. The ISPM will allow exploration of the heliosphere within a few astronomical units of the Sun over the full range of heliographic latitudes. The prime mission objective is to study, as a function of solar latitude, the properties of the interplanetary medium and solar corona. The ISPM is a cooperative mission carried out jointly by ESA and NASA, to be launched in the mid-1980's and utilizing a Jupiter gravity assist to achieve a high solar latitude trajectory. The scientific instrumentation was designed to explore, in the third heliospheric dimension, the properties of the solar corona, the solar wind, the Sun-wind interface, the heliospheric magnetic field, solar radio bursts and plasma waves, solar and galactic cosmic rays, and interplanetary/interstellar neutral dust and gas. Author (ESA)

N82-20049# Academy of Sciences (USSR), Moscow. Inst. of Space Research.

ORIGIN OF THE LARGE-SCALE STRUCTURE OF THE UNIVERSE c90

I. D. Novikov *In* ESA Plasma Astrophys. Nov. 1981 p 179-189 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The problems in galaxy formation theory associated with plasma astrophysics and plasma theory were related to a theory

of origin for the large-scale structure of the universe. Gravitational stability of an expanding relativistic plasma and the evolution of relic neutrino perturbations were considered. The gravitational forces of neutrino perturbations influence the growth of density perturbations in a photon plasma. The nonlinear stage in the kinetic evolution of inhomogeneities due to free gravitating particles in an expanding gravitational medium was numerically simulated. Results for a one dimensional and for a two dimensional gravitational instability are presented. A cosmology of primordial sound waves is hypothesized. Author (ESA)

N82-20050# Massachusetts Inst. of Tech., Cambridge.
GALACTIC DYNAMICS AND GRAVITATIONAL PLASMAS c90
C. C. Lin and G. Bertin *In* ESA Plasma Astrophys. Nov. 1981 p 191-205 refs Sponsored by CNR and NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF Member States, AU, CN, and NO (+20% others)

Phenomena associated with the collective behavior of stellar systems are discussed, focusing on the problem of spiral structure of galaxies. The density wave theory in a relatively complete form makes it possible to formulate a dynamical classification of spiral galaxies. Realistic galaxy models were found to support discrete unstable spiral modes. Modes can be unstable or stable and they can be either normal spiral modes or barred spiral modes, depending on the properties of the equilibrium model. A tentative proposal is that these modes correspond to normal spiral galaxies and transition barred galaxies along with some barred galaxies. Issues related to such a proposal are addressed. Author (ESA)

N82-20051# California Inst. of Tech., Pasadena.
EXTRAGALACTIC RADIO SOURCES c93
R. D. Blandford *In* ESA Plasma Astrophys. Nov. 1981 p 207-214 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Recent observational and theoretical developments in the study of extragalactic radio sources are reviewed. Over 70 radio sources possess jets (narrow features that appear to link the main radio emitting regions with the nuclei of the associated galaxies or quasars). It is argued that these jets are conduits along which flow mass, momentum, energy and magnetic flux. Particular attention is paid to symmetric sources, magnetic collimation and instabilities. These observations are interpreted with a unified theory of active extragalactic objects.
Author (ESA)

N82-20052# Cornell Univ., Ithaca, N. Y. Dept. of Applied Physics.
EXTRAGALACTIC DOUBLE RADIO SOURCES c93
R. V. E. Lovelace and H. A. Scott *In* ESA Plasma Astrophys. Nov. 1981 p 215-221 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A unified model of double radio sources in which the accretion disk of a massive black hole acts as a unipolar induction dynamo, producing oppositely directed beams of relativistic particles is discussed. The hydrodynamics of accretion flow with angular momentum are considered. The empty vortex funnels which are found to occur are essential both in providing a path of easy egress for the outward propagation of beams and in collimating the beams. Hydrodynamic jets are found under some conditions and these may be relevant to mass outflow from active galactic nuclei. The factors which determine the axial magnetic field strength near the inner edge of the accretion disk of the black hole are treated. Author (ESA)

N82-20053*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
EVOLUTION OF X-RAY ASTRONOMY c89
Bruno Rossi *In* ESA Plasma Astrophys. Nov. 1981 p 225-249 refs (For primary document see N82-20030 10-88)
(Contract NAS5-24441)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03A

The development of X-ray astronomy, stopping short of recent observations by grazing incidence telescope, is surveyed. The discovery in 1962 of an extrasolar X-ray source, Sco X-1, with orders of magnitude stronger than astronomers believed might exist is recounted. It turned out to belong to a class of previously unknown galactic objects, the X-ray stars. The identification of a strong X-ray source with the Crab Nebula and the identification of Sco X-1 with a faint, peculiar optical object soon followed. The demonstration that X-ray stars are binary systems, each consisting of a collapsed object (a neutron star, occasionally a black hole) accreting matter from an ordinary star, and the discovery of X-ray bursts are further milestones. The discovery of exceedingly strong X-ray emission from active galaxies, quasars and clusters of galaxies and the demonstration that in these the principal X-ray source is a hot gas filling the space between galaxies sum up results. Author (ESA)

N82-20054# Tokyo Univ. (Japan).
DIAGNOSIS OF THE NEUTRON STAR AND ITS ENVIRONMENT WITH X-RAY ASTRONOMY c89
Minoru Oda *In* ESA Plasma Astrophys. Nov. 1981 p 251-263 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The physics of the neutron star, its atmosphere and its environment are discussed, relating to observational results from X-ray astronomy. The behavior of an X-ray pulsar, Vela X-1, observed with the X-ray astronomy satellite Hakucho, is considered in relation to the nature of the neutron star and its interaction with an accretion disk. X-ray bursts, also observed with the satellite, are a rich source of information for physics of the atmosphere and the plasma environment of the neutron star. The hard X-ray imaging of the Crab Nebula undertaken by balloon observation reveals the internal structure of the Crab Nebula.
Author (ESA)

N82-20055# Cambridge Univ. (England). Inst. of Astronomy.
PRODUCTION AND PROPAGATION OF JETS c93
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 267-271 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The processes in active galactic nuclei which give rise to the large-scale jet structures in radio galaxies are dealt with. The physical conditions in beam plasma and the initial collimation are treated. Collimated jets are set up within a few parsecs of a massive black hole. Jet physics show that the large-scale radio structures are influenced by the galactic and extragalactic environment. The energy densities are low; the speeds are probably not relativistic. Even though the physics is not extreme, large-scale source morphology is comparable to computational meteorology for complexity. Primary energy production seems easier to understand, even though it entails more extreme conditions, e.g., relativistic flows, black holes. The crucial processes may be quite symmetric and thus more amenable to serious modelling.
Author (ESA)

N82-20056# California Univ., Berkeley. Dept. of Astronomy.
PULSAR THEORY: PARTICLE ACCELERATION AND PHOTON EMISSION IN THE POLAR FLUX TUBE c90
Jonathon Arons *In* ESA Plasma Astrophys. Nov. 1981 p 273-289 refs (For primary document see N82-20030 10-88)
(Grant NSF AST-79-23243)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Particle acceleration and photon emission in the polar field lines of a pulsar are considered. Observations of pulsar pulse, subpulse and micropulse morphology, spectra and polarization, as well as high frequency radiation are reviewed and used to suggest a steady streaming model with pair creation as the seat of the emission phenomenon. The energetics of polar beam flow are described with emphasis on acceleration in a slot gap. A possible global model of the magnetosphere is outlined. The plasma content of the flow is described, then used to discuss several transfer processes which may be associated with subpulse morphology and polarization and with the formation of micropulses. Various ideas about possible emission processes are discussed with emphasis on emission from shear flows in the

boundary layers of the pair plasma flow. A model of the origin of marching subpulses is suggested, involving a rotating drift wave over the polar cap. Author (ESA)

N82-20057# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA HYDRODYNAMICS **c90**
Stirling A. Colgate *In* ESA Plasma Astrophys. Nov. 1981 p 291-296 refs Sponsored by California Univ. and NSF Prepared in cooperation with New Mexico Inst. of Mining and Technology (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The physics as well as astrophysics of the supernova (SN) phenomenon are illustrated with the appropriate numbers. The explosion of a star, a supernova, occurs at the end of its evolution when the nuclear fuel in its core is almost, or completely, consumed. The star may explode due to a small residual thermonuclear detonation, type I SN, or it may collapse, type I and type II SN, leaving a neutron star remnant. The type I progenitor is thought to be an old accreting white dwarf, 1.4 interior mass, with a close companion star. A type II SN is thought to be a massive young star, 6 to 10 interior mass. The mechanism of explosion is still a challenge to model, being the most extreme conditions of matter and hydrodynamics that occur presently and excessively in the universe. Author (ESA)

N82-20058# Cambridge Univ. (England). Inst. of Astronomy.
HOT PLASMAS IN ACTIVE GALACTIC NUCLEI **c90**
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 297-301 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Transrelativistic plasma, where the mean energy per particle may be > or equivalent to (m sub e) c squared, is considered. In the deep potential well around a compact object, plasma can retain thermal energies of 1 to 100 Mev per particle, even if it is gravitationally bound. The radiative losses are then likely to be due to synchrotron/Compton emission. Pair production may be so prolific that positrons greatly outnumber the ions; the ion and electron temperatures would be unequal unless there are strong collective effects which couple them. These processes, important in determining the radiative and dynamical properties of galactic nuclei, are described. Author (ESA)

N82-20059# Ecole Polytechnique, Palaiseau (France). Centre de Physique Theorique.
ON THE POSSIBILITY OF EXISTENCE OF LARGE AMPLITUDE WAVES AROUND PULSARS **c90**
Estelle Asseo *In* ESA Plasma Astrophys. Nov. 1981 p 309-312 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Possible acceleration of particles is related to the properties of propagation and stability of large amplitude waves. Radiative damping effects compete with Weibel instability to prevent the propagation of large amplitude, low frequency, linearly polarized plasma waves. These inhibition phenomena are important for understanding the eventual acceleration of particles in the strong waves emitted by pulsars beyond the light cylinder distance. Due to the electric field induced by the rotation of a star, electromagnetic forces in the direction of the magnetic field lines dominate gravitational ones. Charged particles cannot remain bounded to the neutron star surface; they form a plasma which flows along closed and open magnetic field lines, fills the pulsar magnetosphere, and reaches regions beyond the light cylinder. The large amplitude radiated wave propagates through this plasma. Realistic models have to include simultaneously the electromagnetic wave emission and the relativistic plasma outflow.
Author (ESA)

N82-20060*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
ELECTRON ACCELERATION IN MAGNETOSONIC SHOCK FRONTS **c93**
K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 313-315 refs (For primary document see N82-20030 10-88) (Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

It is shown that the low frequency turbulence driven by ions reflected in the foot of magnetosonic shocks can accelerate electrons to large energies. The mechanism seems to account for the energetic electron fluxes and the associated wave activity observed in the Earth bow shock. Author (ESA)

N82-20061# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
HIGH ENERGY COSMIC RAY ACCELERATION BY DIFFUSIVE SHOCKS **c93**
P. O. Lagage and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 317-318 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Difficulties with the mechanism of acceleration of cosmic rays by shock waves are addressed. One of the problems is that shock waves cannot accelerate particles to very high energies. This is because the mean time between shock crossings is long for high energy particles so that the acceleration process is slow. A derivation of the mean crossing time is presented which has the advantage of being readily generalized when the diffusion coefficient is space dependent. The upper limit to the energy that can be attained for a supernova shock, and for a stellar wind terminal shock, is evaluated. Author (ESA)

N82-20062# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
COSMIC RAY ACCELERATION BY STELLAR WINDS AND SELF-CONFINEMENT IN GIANT H2 REGIONS **c93**
T. Montmerle and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 319-322 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

An idealized model of galactic cosmic ray acceleration by stellar winds is explained. The region behind the stellar wind shock, filled with a hot, tenuous gas, forms a bubble which expands gradually into the interstellar medium. Acceleration by a plane wave is considered; all the acceleration takes place in the low density regions on both sides of the shock. The cosmic rays are accelerated at the shock boundary of the stellar winds and are partially confined in the H2 region and in the molecular cloud. The cosmic ray density near the acceleration region is high. However, the associated pressure remains low with respect to the gas pressure and its effect on the shock structure is negligible. If the particles accelerated by this mechanism are extracted from the wind, implied injection rate is very low.
Author (ESA)

N82-20063# Nagoya Univ. (Japan). Dept. of Astrophysics.
OBSERVABLE PROPERTIES OF ACCRETION DISKS **c89**
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 325-327 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Astronomical phenomena associated with the accretion of matter onto stars and galaxies are surveyed. The standard disk model from plasma physics is introduced and its modification by X-ray irradiation is discussed. Properties of the accretion disk formed around neutron stars are found from observations of the absorption of X-rays by the accretion disk, radiation emitted from the disk, and the change of the spin periods of X-ray pulsars. The standard model is constructed for the stationary disk, while nonstationary disks can be responsible for transient phenomena including X-ray and gamma-ray bursts. Author (ESA)

N82-20064# Memorial Univ. of Newfoundland, St. Johns. Dept. of Mathematics and Statistics.
BONDI ACCRETION **c90**
D. Summers *In* ESA Plasma Astrophys. Nov. 1981 p 329-330 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The Bondi accretion model is analyzed. It is pointed out that the model is still not well understood. While the Bondi critical accretion rate is widely quoted, its conditions of validity

are in doubt. Reexamination of the stability of the Bondi critical solution, the shocked Bondi solutions, and the wholly subsonic solutions is suggested. Author (ESA)

N82-20065# Illinois Univ., Urbana. Dept. of Physics.
ELECTRON KINETIC EQUATIONS IN COMPTONIZATION BY ISOTROPIC PHOTONS **c72**
Naoki Iwamoto *In* ESA Plasma Astrophys. Nov. 1981 p 331-332 refs Co-Sponsored with NORDITA (For primary document see N82-20030 10-88)
(Grant NSF PHY-80-25605)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The kinetic equations that describe the time evolution of the distribution of nondegenerate nonrelativistic electrons interacting with isotropic thermal photons via Compton scattering are derived. Two cases, when the electrons are isotropic and when the electron motion is restricted to one spatial dimension due to strong magnetic field, are considered. The latter case is relevant to radiative transfer in the atmosphere of neutron stars with magnetic field of order 10 to the 12th power G. The time scales associated with various competing processes in the system are compared and the applicability of these equations is discussed. Explicit calculation results for the entropy gain show that these equations satisfy Boltzmann's H theorem for the coupled electron-photon system as a whole. Author (ESA)

N82-20066# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
PULSAR MAGNETOSPHERE POTENTIAL STRUCTURE **c90**
Dean F. Smith, Lorant A. Muth, and Jonathan Arons (California Univ., Berkeley) *In* ESA Plasma Astrophys. Nov. 1981 p 333-335 refs Sponsored by NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The electric fields in the polar cap region of the magnetosphere of a pairless orthogonal rotator are calculated, using a modified Poisson equation for the potential, Phi. This is the first step in determining whether return currents are formed in these models and the resulting global current flow patterns. The potential was calculated from 0.1 to 5 R sub L, where R sub L is the light cylinder radius, using known results for Phi at 0.1 R sub L with an inner last closed magnetic field line corresponding to that of a point dipole. The potential distribution indicates that return currents should be formed. Author (ESA)

N82-20067# Cambridge Univ. (England). Inst. of Astronomy.
ION PRESSURE-SUPPORTED ACCRETION TORI AND THE ORIGIN OF RADIO JETS. A PLEA FOR SPECIFIC ADVICE ON THE PLASMA PHYSICS **c93**
E. S. Phinney *In* ESA Plasma Astrophys. Nov. 1981 p 337-341 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Despite their impressive outputs of power, it is suggested that quasars probably do not provide diagnostics of any exotic relativistic physics. It is argued that radio galaxies may be cleaner laboratories which give a direct view of purely nonthermal electrodynamic processes occurring near black holes. Quasar and radio galaxy observations are reviewed. How inadequate cooling and particle coupling can give rise to a pressure supported accretion torus is described. Its structure in the absence of large scale magnetic fields and how it can be modified to extract sufficient energy from a rotating black hole to power a double radio source are discussed. Relevant plasma parameters are postulated. Author (ESA)

N82-20068# Sterrewacht, Leiden (Netherlands).
A DOUGHNUT MODEL OF QUASARS **c90**
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 349-350 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A model for quasars, which overcomes the problem with accretion disks of not knowing the correct viscosity, is proposed. One of the most studied scenarios involves an accretion disk in which the gas is heated by viscous processes so that it radiates energy and spirals slowly into the black hole as a result of the loss of energy and angular momentum. An alternative scenario in which the viscosity is small enough that viscous evolution does not occur and where the accreted gas has the same component of angular momentum along the rotation axis at all points in space, so that the gas forms a ring around the black hole, is described. The infalling gas deposits its energy in the ring, which then radiates predominantly in the near ultraviolet, and may result in the thermal peak which is well observed in 3C273 as well as in other quasars. Author (ESA)

N82-20069# Sterrewacht, Leiden (Netherlands).
PLASMA BEAMS FROM DOUGHNUTS **c90**
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 351-352 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A single model that explains the jets seen in radio galaxies and SS433, in which gas is accelerated by radiation pressure from a doughnut, is proposed. It has long been suspected that the extended lobes of double radio sources are powered by beams of material being ejected from the central galaxy. It is suggested that in cases where the viscosity is small, a doughnut or torus of gas may form in orbit around a compact body (neutron star or black hole) and that this can provide an alternative to accretion disks in explaining the energy requirements of quasars. This model seems to indicate what to expect from gas flows off standard alpha disks. General validity is implied in application to axisymmetric accretion systems. Author (ESA)

N82-20070# Turin Univ. (Italy). Ist. di Fisica Generale.
LARGE SCALE KELVIN-HELMHOLTZ INSTABILITIES IN EXTRAGALACTIC RADIO JETS **c93**
A. Ferrari and E. Trussoni *In* ESA Plasma Astrophys. Nov. 1981 p 353-357 refs Prepared in cooperation with CNR, Turin (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The relation of the morphological features detected in radio jets from active galactic nuclei with the development of large scale Kelvin-Helmholtz instabilities in supersonic flows is discussed. In particular, it is pointed out that, depending on the Mach number and the beam velocity, different damping processes are expected to occur which dissipate the unstable modes and saturate their nonlinear evolution. Applications of this theoretical scheme to peculiar radio jets are described. Author (ESA)

N82-20071# Harry Diamond Labs., Adelphi, Md.
SECOND-ORDER NONLINEAR CONDUCTIVITY TENSOR FOR AN UNMAGNETIZED RELATIVISTIC TURBULENT PLASMA **c75**
Howard E. Brandt *In* ESA Plasma Astrophys. Nov. 1981 p 361-364 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The symmetry properties of the second-order nonlinear conductivity tensor for an unmagnetized, relativistic, weakly turbulent plasma are considered in the analysis of collective Bremsstrahlung instability. This tensor has an exact symmetry which, if resonant wave-particle interactions are neglected, becomes the widely known symmetry related to the Manley-Rowe relations, crossing symmetry, and the nondissipative nature of the nonlinear current. Using the well-known expression for the conductivity from plasma turbulence theory, a polynomial representation for the tensor is obtained in which all derivatives are removed and the pole structure is clearly exhibited. The exact symmetry can be obtained by a lengthy algebraic reduction using this representation. It can also be obtained much more simply and directly by using a coordinate-free differential geometric formulation. Author (ESA)

N82-20072# Tel-Aviv Univ. (Israel). Dept. of Physics and Astronomy.
COLLECTIVE GRAVITATIONAL EFFECTS **c46**
Gerald E. Tauber *In* ESA Plasma Astrophys. Nov. 1981

p 365-368 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A covariant statistical mechanics which underlies a microscopic description of particles moving under the influence of gravitational forces is established. The internal state of large masses, e.g., a gravitating gas, must be described by the general theory of relativity, applied not only to the gravitational field, but also to the motion of matter that generates the field that acts on it. Even if the mass concentration is not high, relativistic effects are important, such as in the case of high temperatures or degenerate matter distributions. The situation becomes more complicated when deviations from thermal equilibrium, or particles interacting via some given force law, are considered. An 8N-dimensional phase space is constructed for which Liouville's equation can be written down. The BBGKY hierarchy of equations is then obtained by defining a reduced distribution function and integrating over an appropriate sub-space. The resulting equation contains the collective effects due to particle interaction.
Author (ESA)

N82-20073*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
CONFINEMENT OF COSMIC RAYS IN MOLECULAR CLOUDS c93
Ellen G. Zweibel and J. Michael Shull (Joint Inst. for Laboratory Astrophysics) *In* ESA Plasma Astrophys. Nov. 1981 p 371-373 refs Co-sponsored by NASA (For primary document see N82-20030 10-88)
(Grant NSF AST-80-19960)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The consequences of cosmic ray production by a supernova in a molecular cloud are discussed. Self-trapping problems for a higher flux of cosmic rays in a molecular cloud are focused on. The column density of molecular clouds is probably too high to explain the majority of galactic cosmic ray sources, even allowing for fortuitous asymmetry in the placement of the supernova in the cloud, however, measurements of antiproton flux suggest that some cosmic ray sources do have a high column density. The large predicted gamma-ray luminosity of such a cloud invites comparison with COS-B sources. Author (ESA)

N82-20074# Lodz Univ. (Poland).
CERTAIN ASPECTS OF PRIMARY COSMIC RAYS COMPOSITION AT ENERGIES OF 10 TO THE 14TH POWER TO 10 TO THE 15TH POWER eV c93
J. Kempa *In* ESA Plasma Astrophys. Nov. 1981 p 375-376 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Indications that the chemical composition of primary cosmic rays at energies from 10 to the 14th power to 10 to the 15th power eV consists of heavier particles than in the energy domain 10 to the 12th power eV are examined. From analysis of high energy hadrons, in extensive air showers, the pure proton composition of the primary cosmic radiation can be excluded. The comparison of various components shows that the average atomic weight of the primary particles is about 10 to 15.
Author (ESA)

N82-20075# Massachusetts Inst. of Tech., Cambridge.
FORMATION OF ION CONICS AND LOWER HYBRID ACCELERATION IN THE SUPRAURORAL REGION c90
Tom Chang and Bruno Coppi *In* ESA Plasma Astrophys. Nov. 1981 p 379-381 refs Sponsored by AFGL (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

It is argued that broadband lower hybrid waves generated by energetic electron beams can be quite efficient in accelerating ions of ionospheric origin (H+ and O+). Throughout the lower altitudes of the supraurora region, satellite measurements detected plasma waves dominated by broadband lower hybrid modes. How ions of ionospheric origin can be energized perpendicularly to the geomagnetic field lines by resonant interactions with these modes is shown. The added influence of the Earth's magnetic field geometry can lead the energized portion of the ions to evolve into conic distributions. The calculated pitch angles of the ions cluster around 90 to 140 deg. Pitch angles < 90 deg can also occur, since the ions can drift towards the ionosphere initially. Author (ESA)

N82-20076# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXISTENCE OF THE ION TEARING MODE c93
H. Goldstein *In* ESA Plasma Astrophys. Nov. 1981 p 383-384 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

An ion tearing mode is suggested as a possible onset mechanism for magnetospheric substorms. Earlier work, based on a WKB approximation where the wavelength of the mode along the tail had to be restricted to values much smaller than the characteristic length for magnetic field variation in that direction, indicated that the ion tearing instability may not exist in the magnetotail. In the present theory the WKB method is abandoned and the exact energy principle for the (two-dimensional) Vlasov theory is used instead. The tail equilibrium is represented by two-dimensional self-consistent solutions. The computed minimizing modes have the shape of tearing modes. The characteristic length is by order of magnitude the length scale for the magnetic field variation. Results show that the ion tearing instability does in fact occur in the long wavelength regime and therefore is a possible onset mechanism.
Author (ESA)

N82-20077# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
INSTABILITIES IN INHOMOGENEOUS COLLISION-FREE SELF-GRAVITATING STELLAR SYSTEMS c90
Wolfgang Seboldt *In* ESA Plasma Astrophys. Nov. 1981 p 385-389 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Stability criteria for collision-free self-gravitating stellar systems are discussed with applications to elliptical galaxies. It is concluded that rotationally symmetric systems which are either sufficiently oblate or prolate are unstable against ringlike and sausagelike perturbations, respectively. Author (ESA)

N82-20078# Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
DOUBLE LAYER AND POTENTIAL JUMP: A REVIEW OF LABORATORY EXPERIMENTAL EVIDENCE c75
M. Guyot, C. Hollenstein, and M. Tran *In* ESA Plasma Astrophys. Nov. 1981 p 391-393 refs Sponsored by Swiss National Science Foundation and Euratom (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Double layers, potential differences which occur in plasma, are characterized. Double layers are collisionless with a transition region of a few tens Debye length. They are created when the electron drift velocity is greater than the thermal velocity. Aside from this class of potential structure, another type of potential structure was discovered recently for which the preceding criteria concerning collisionality and the electron drift velocity are violated, i.e., the potential jump. The conditions under which the potential jump occurs are outlined. Author (ESA)

N82-20079# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
QUASISTATIC EVOLUTION OF PREFLARE EQUILIBRIA c92
Wolfgang Zwingmann *In* ESA Plasma Astrophys. Nov. 1981 p 297-400 refs Sponsored by Deutsche Forschungsgemeinschaft (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A special type of solar preflare equilibria, the newly-emerging-Flux model, is considered. This model describes the quasistatic evolution occurring before the onset of a solar eruptive process (e.g., flare) as the formation of a new magnetic structure within an otherwise stationary equilibrium. The model is analyzed

quantitatively in the framework of two-dimensional magnetohydrostatic theory. It is shown that the equilibrium ceases to exist when the newly emerging flux exceeds a critical field strength; this point is regarded as the onset of an eruptive process. The equilibrium and the onset criterion are discussed quantitatively.
Author (ESA)

N82-20080*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
LARGE LOOP THERMAL MODELS OF SOLAR HARD X-RAY BURSTS **c92**
Dean F. Smith and D. W. Harmony *In* ESA Plasma Astrophys. Nov. 1981 p 401-404 refs Co-sponsored with NSF (For primary document see N82-20030 10-88)
(Grant NsG-7505)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

Results for small loop thermal models of hard X-ray bursts are extended to large loops. In this model a magnetic arch with a coronal length of 45,000 km has the electrons near the top heated to temperatures above 1 billion K. The resulting conduction fronts which form are dominated by collisionless processes and travel down the arch to the transition region and chromosphere where they evaporate off part of the latter. This relatively cool material travels back up the loop and eventually quenches the source for energy injection times of order 10 sec. Most of the X-ray emission comes from the footpoints of the arch over most of the source lifetime and the spectrum is a power law with a typical spectral index of 3.0. Even though the efficiency gain in this model is only 2.8, it is much easier from the point of view of plasma physics to heat all the electrons in a plasma than to accelerate a substantial fraction of them. Author (ESA)

N82-20081# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
WAVE HEATING AND ACCELERATION OF SOLAR WIND IONS BY CYCLOTRON RESONANCE **c92**
Eckart Marsch *In* ESA Plasma Astrophys. Nov. 1981 p 405-406 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A model is presented which describes the radial evolution of solar wind ion temperatures and speeds within a fluid framework. Resonant wave-particle interactions are taken into account and the ion-wave dynamic equilibrium is calculated self-consistenly. Numerical results show that self-consistency in the calculations is of major importance for a realistic description of energy and momentum balance between waves and particles. Author (ESA)

N82-20082*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
COMMENTS ON HIGH MACH NUMBER MAGNETOSONIC SHOCKS **c72**
K. Papadopoulos *In* ESA Plasma Asrophys. Nov. 1981 p 409-411 refs (For primary document see N82-20030 10-88)
(Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 20H

It is shown that the ion thermalization process required by the Hugoniot conditions for high Mach number magnetosonic shocks is controlled by loss cone type distributions, i.e., {partial differentiation of the ion distribution function/partial differentiation of the ion distribution energy component) > zero, formed by a combination of ion reflection and gyration downstream. The thermalization length corresponds to few ion gyroradii, while the final distribution deviates substantially from Maxwellian. The results are applied to the Earth bow shock. Author (ESA)

N82-20083# Academia Sinica, Peking (China). Inst. of Space Physics.
IDENTIFICATION OF THE DISCONTINUITIES AT THE MAGNETOPAUSE **c46**
Zhou Guo-cheng *In* ESA Plasma Astrophys. Nov. 1981 p 413-414 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

Different magnetopause discontinuities were identified by characterizing these in terms of the magnetic fields, the bulk flow velocity and other thermodynamic parameters. This total-parameter method is independent of the normal direction of the magnetopause. The measurements of the magnetic field and the plasma during the IMP-6, and ISEE 1 and 2 magnetopause crossings showed that the sum of the thermal pressure and magnetic pressure of the plasma remained nearly constant while other parameters changed at a different rate. Based on these observed data, the discontinuity equations for an ideal MHD fluid in which the pressure was assumed to be isotropic were solved. Solutions include the tangential discontinuities (twelve sets), the rotational discontinuity, the transitional discontinuities between tangential and rotational discontinuities (two sets), and the transitional discontinuities between a tangential discontinuity and a slow shock wave (nine sets). Author (ESA)

N82-20084# Academia Sinica, Peking (China). Inst. of Space Physics.
A PLASMA CURRENT SHEET STUDIED BY MEANS OF THE PARTICLE MOTION **c75**
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1981 p 417-419 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

A one dimensional plasma current sheet is modeled as the regular pattern of motion of charged particles moving in a neutral sheet magnetic field. A guiding center theorem similar to that of Alfven is used. The '8' shaped motion in the nonperturbation region (where the magnetic field is small or equal to zero) is divided into two circular motions. Since each circular motion is equivalent to a magnet, the 8 shaped motion is equivalent to two magnets in opposite direction. The electric plasma current is derived with the plasma distribution function a funcion of constant motion. Results show that the current sheet is mainly due to the inverse drift motion in the nonperturbation region. A self-consistent magnetic field is also derived from the relation between charged particle motions and the magnetic field. Author (ESA)

N82-20085# Academia Sinica, Peking (China). Inst. of Space Physics.
THE ANALYTICAL TRAJECTORY OF THE CHARGED PARTICLE MOVING IN A NEUTRAL SHEET MAGNETIC FIELD **c90**
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1980 p 421-423 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The trajectory of a charged particle, moving in a neutral magnetic field, is derived analytically. The solution of the equation of motion is written as: Referents of a relation (+) = Referents of a relation sub c + Referents prime of a relation (+), where Referents of a relation sub c is the position of the center of the trajectory and Referents prime of a relation (+) is a closed oscillatory motion. The results are essentially the same as with numerical trajectory evaluation. The trajectory of a particle in a neutral sheet magnetic field, including the region where the magnetic field is equal to zero, can be expressed as two motions. One is along a closed oscillatory trajectory in the plane perpendicular to the magnetic field; its center drifts in a direction parallel to the neutral line. The other follows the magnetic line with a constant velocity. In the perturbation region, the closed oscillatory motion is circular, while in the nonperturbation region it is 8 shaped. In the nonperturbation region, its center drifts in the opposite direction to that in the perturbation region and its drift velocity is very large. Author (ESA)

N82-20086# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ACCELERATION OF COSMIC RAYS BY SHOCK WAVES **c93**
W. I. Axford *In* ESA Plasma Astrophys. Nov. 1981 p 425-449 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

The problem of the origin of galactic cosmic rays is reviewed. The observed properties of galactic cosmic rays and the interferences that can be drawn from them are summarized.

The basic properties of the interstellar medium are included. Scatter-free acceleration of energetic particles by shock waves is outlined. The acceleration mechanism is then extended, taking into account scattering. Modifications associated with time dependence and losses due to interaction with the background medium are described along with effects of nonplanar geometry. The possibility that galactic cosmic rays are accelerated by supernova shocks is discussed. Difficulties encountered with the shock acceleration theory indicate that a completely nonlinear treatment is necessary. This must comprehend the generation amplification and damping of hydromagnetic waves in a medium with strong supersonic turbulence and streaming cosmic ray fluxes. Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-20087*# Stanford Univ., Calif. Inst. for Plasma Research.

THE DIFFERENTIAL EMISSION MEASURE OF DYNAMIC CORONAL LOOPS

Spiro K. Antiochos Dec. 1981 10 p refs
(Grants NGL-05-020-272; NAGw-92; Contract N00014-75-C-0673)
(NASA-CR-168638; SU-SUIPR-863) Avail: NTIS HC A02/MF A01 CSCL 03A

The effects of time dependent phenomena, such as flare energization and decay, on the temperature and density structure of the transition region and, in particular, on the form of the differential emission measure are studied. It is found that unlike the case of the static models, the form of the differential emission measure can be used to determine the important physical mechanisms in the dynamic models. B.W.

N82-20088*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

DOCUMENTATION FOR THE MACHINE-READABLE VERSION OF THE CATALOGUE OF STARS WITHIN 25 PARSECS OF THE SUN

Wayne H. Warren, Jr. Jan. 1982 17 p refs
(NASA-TM-84039; NSSDC/WDC-A-R&S-82-03) Avail: NTIS HC A02/MF A01 CSCL 03A

The machine-readable version of the Catalogue of Stars within twenty-five parsecs of the Sun contains essentially all information given in Table Ia of the published catalog, plus positional data and all cross references to other catalog numbers given in Table IIa. Not included from Table Ia are the flags (asterisks appended to catalog numbers) indicating notes in the published catalog, nor are the notes in machine-readable form. Omitted from Table IIa are the finding chart identifiers (Lowell G numbers or notes reference) and miscellaneous cross identifications to other names and catalog identifiers. The machine-readable version of the subject catalog is currently available on magnetic tape from the Astronomical Data Center. A.R.H.

N82-20089*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

DATA ANNOUNCEMENT BULLETIN: THE ARIEL V SSI 3A X-RAY CATALOGUE

Dec. 1981 1 p
(NASA-TM-84029; NSSDC/WDC-A-R&S-81-13) Avail: NTIS HC A02/MF A01 CSCL 03A

The catalog covers the galactic plane in low latitudes ($b2 < 10$) and high galactic X-ray sources. It is based on the complete 5 1/2 year data base of the sky survey instrument on the Ariel 5 satellite. Source identifications, error boxes and fluxes are included. The low latitude portion contains 109 X-ray sources. The high latitude revision contains 142 sources. S.L.

N82-20090*# Information Systems and Networks Corp., Chevy Chase, Md.

SPACE TELESCOPE OBSERVATORY MANAGEMENT SYSTEM PRELIMINARY TEST AND VERIFICATION PLAN Final Report

James S. Fritz, Charles F. Kaldenbach, and Warren B. Williams
8 Jan. 1982 215 p refs
(Contract NAS5-26624)
(NASA-CR-168587; ISN/TR-81/1079) Avail: NTIS HC A10/MF A01 CSCL 03A

The preliminary plan for the Space Telescope Observatory Management System Test and Verification (TAV) is provided. Methodology, test scenarios, test plans and procedure formats, schedules, and the TAV organization are included. Supporting information is provided. N.W.

N82-20091# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.

SPECTRAL AND TEMPORAL BEHAVIOR OF THE X-RAY BINARY STARS Cgy X-1 IN THE HARD X-RAY DOMAIN [DAS SPEKTRALE UND ZEITLICHE VERNALTEN DES VARIABLEN ROENTGENDOPPELSTERNS Cyg X-1 IM HARTEN ROENTGENBEREICH]

Helmut Steinle Jun. 1981 138 p refs In GERMAN
(MPI-PAE/Extraterr-166; ISSN-0340-8922) Avail: NTIS HC A07/MF A01

The X-ray spectrum of binary stars within the energy range of 15 to 160 keV was measured. The Compton scattering of low energy photons in hot plasma is described and is adjusted to the binary star Cyg X-1 spectrum. The radiation intensity burst in the 15 to 150 keV shows large fluctuation within seconds. The chronological sequence of registered Cyg X-1 photons shows statistical dissipation and maximum three events take place in 5 msec. E.A.K.

N82-20092# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.

THE MASS SPECTRUM OF STELLAR ORIGIN [DAS MASSENSPEKTRUM BEI DER STERNENTSTEHUNG]

Hans Zinnecker Aug. 1981 297 p refs In GERMAN
(MPI-PAE-Extraterr-167; ISSN-0340) Avail: NTIS HC A13/MF A01

The distribution function of stellar masses (mass spectra) in stellar formation was investigated. Two fundamentally different models of mass spectra are presented. The mass spectrum models are established on direct fragmentation and hierarchical fragmentation. The kinetic theory is linear in both cases. The model remains linear because the number of original protostars remains the same. The accretion model examines quantitatively the effect of accretion on the shape of the mass spectra. The model shows that variations in the mass spectra of the field star in other galaxies depend on fast dispersion of interstellar gases in the average interstellar magnetic fields. It is found that direct fragmentation is more likely to be the exception and that hierarchical fragmentation is more likely to be the rule. E.A.K.

N82-20093# Technische Univ., Berlin (West Germany). Institut fuer Astronomie und Astrophysik.

[ACTIVITIES REPORT OF THE INSTITUTE FOR ASTRONOMY AND ASTROPHYSICS] Annual Report, 1980

R. Wielen 1980 9 p refs In GERMAN
(TUB-IAA-Mitt-1) Avail: NTIS HC A02/MF A01

Research into stars, star systems, and X-ray astronomy is summarized. Model atmospheres for normal stars, white dwarfs, and variable stars were developed and the structure of He stars and neutron stars was investigated. The dynamical evolution of star systems, such as star clusters, galaxies, and galactic clusters, was studied as well as star currents, galactic shock fronts, galactic radio continuum emission, and the density distribution in galactic clusters. Author (ESA)

N82-20094# Technische Univ., Berlin (West Germany). Institut fuer Astronomie und Astrophysik.

[ACTIVITIES REPORT OF THE INSTITUE FOR ASTRONOMY AND ASTROPHYSICS] Annual Report, 1980 [INSTITUT FUER ASTRONOMIE UND ASTROPHYSIK]

R. Wielen 1981 9 p refs In GERMAN
(TUB-IAA-Mitt-2) Avail: NTIS HC A02/MF A01

Research projects on stars, interstellar matter, star systems and X-ray astronomy are summarized. Spectral measurements of normal stars, He stars, white dwarfs, variable stars, and stellar X-ray sources were performed and interpreted. The formation of interstellar matter through expansion of the atmosphere of cold

stars was investigated. Work on the dynamical evolution of star clusters, galaxies, and galactic clusters and on star currents, density distribution in star and galactic clusters, galactic shckfronts, and galactic radio emission is surveyed. Author (ESA)

N82-20053*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
EVOLUTION OF X-RAY ASTRONOMY
Bruno Rossi *In* ESA Plasma Astrophys. Nov. 1981 p 225-249 refs (For primary document see N82-20030 10-88)
(Contract NAS5-24441)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03A

N82-20054# Tokyo Univ. (Japan).
DIAGNOSIS OF THE NEUTRON STAR AND ITS ENVIRONMENT WITH X-RAY ASTRONOMY
Minoru Oda *In* ESA Plasma Astrophys. Nov. 1981 p 251-263 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20063# Nagoya Univ. (Japan). Dept. of Astrophysics.
OBSERVABLE PROPERTIES OF ACCRETION DISKS
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 325-327 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-20095 Iowa Univ., Oakdale.
POLARIZATION PROPERTIES OF MAIN-LINE OH MASER EMISSION FROM CIRCUMSTELLAR SHELLS OF LATE TYPE VARIABLE STARS Ph.D. Thesis
Mark J. Claussen 1981 114 p
Avail: Univ. Microfilms Order No. 8128380

Main line OH emission was observed in all four Stokes parameters in seven late type variable stars and the F8 supergiant IRC + 10420. The late type stars are WX Psc, IK Tau, U Her, UX Cyg, R Leo, R LMI, and U Ori. Those sources whose spectra are 'prototypical' of standard expanding shell models (the emission occurring in two well defined velocity ranges) had either no polarization or very weak circular polarization in their spectra. The spectrum of WX Psc, the 'prototype', was unpolarized. In sources with no systematic spectral structure, moderate to strong (>30%) circular and sometimes linear polarization was observed in UX Cyg, U Ori, and IRC + 10420 at 1665 MHz. The linear features in UX Cyg and IRC + 10420, when combined with associated circularly polarized features are suggestive of Zeeman patterns. Dissert. Abstr.

N82-20096# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTRODUCTION TO CELESTIAL MECHANICS
Hans U. Pilchowski, Wilson C. C. Silva, and Luiz Davilo D. Ferreira Jun. 1981 131 p refs In PORTUGUESE; ENGLISH summary (INPE-2126-RPE/350) Avail: NTIS HC A07/MF A01

Basic mechanical concepts from the Central Field to Lagrangian and Delanay Equations are presented. Orbital determination, reference systems and their transformation are also presented. N.W.

N82-20097*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HEAO 1 MEASUREMENTS OF THE GALACTIC RIDGE
D. M. Worrall (Maryland Univ., College Park), F. E. Marshall, E. A. Boldt, and Jean H. Swank Oct. 1981 38 p refs Submitted for publication
(NASA-TM-83844) Avail: NTIS HC A03/MF A01 CSCL 03B

The HEAO A2 experiment data was systematically searched for unresolved galactic disc emission. Although there were suggestions of non-uniformities in the emission, the data were consistent with a disc of half-thickness 241 + 22 pc and surface emissivity (2-10 keV) at galactic radius R(kpc) of 2.2 10 to the minus 7th power exp(-R/3.5) erg/sq cm to the (-2)power/s (R > 7.8 kpc). giving a luminosity of approximately 4.4 10 to the 37th power erg S to the (-1) power. If the model is extrapolated to radii less than 7.8 kpc, the unresolved disc emission is approximately 1.4 10 to the 38th power erg S to the (-1) power (2-10 keV) i.e., a few percent of the luminosity of the galaxy in resolved sources. the disc emission has a spectrum which is significantly softer than that of the high galactic latitude diffuse X-ray background and it is most probably of discrete source origin. Author

N82-20098*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ASTROPHYSICAL TESTS FOR RADIATIVE DECAY OF NEUTRINOS AND FUNDAMENTAL PHYSICS IMPLICATIONS
F. W. Stecker and R. W. Brown (Case Western Reserve Univ.) Dec. 1981 31 p refs Submitted for publication
(NASA-TM-83873) Avail: NTIS HC A03/MF A01 CSCL 03B

The radiative lifetime tau for the decay of massious neutrinos was calculated using various physical models for neutrino decay. The results were then related to the astrophysical problem of the detectability of the decay photons from cosmic neutrinos. Conversely, the astrophysical data were used to place lower limits on tau. These limits are all well below predicted values. However, an observed feature at approximately 1700 A in the ultraviolet background radiation at high galactic latitudes may be from the decay of neutrinos with mass approximately 14 eV. This would require a decay rate much larger than the predictions of standard models but could be indicative of a decay rate possible in composite models or other new physics. Thus an important test for substructure in leptons and quarks or other physics beyond the standard electroweak model may have been found. Author

N82-20099# Technische Universitaet, Brunswick (West Germany). Inst. fuer Geophysik und Meteorologie.
ROUTINE DATA PROCESSING AND PHYSICAL INTERPRETATION OF DATA OBTAINED BY THE FLUXGATE AND SEARCH COIL MAGNETOMETER EXPERIMENTS ON BOARD HELIOS 1 AND 2 Final Report, Jun. 1981
Fritz Manfred Newbauer, Henning Barnstorf, Hans-Juergen Beinroth, Kurt Ulrich Denskat, Guenter Musmann, Hinrich Rupprecht, and Peter Volkmer Bonn Bundesministerium fuer Forschung und Technologie Nov. 1981 107 p refs In GERMAN; ENGLISH summary Co-sponsored by Bundesministerium fuer Forschung und Technologie and DFVLR
(BMFT-FB-W-81-039; ISSN-0170-1339) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22.70

The processing and interpretation of data collected by Helios 1 and Helios 2 showed discontinuities and wave characteristics in the solar and interplanetary magnetic fields are described. The fluxgate measurements are corrected for filter phase shifts, zero shifting by variable spacecraft fields, magnetometer zeroes and misalignment angles. The treatment of the spectral data of the search coil magnetometer involves the application of the calibration factors whereas for the waveform data, corrections for the stray magnetic field B/sub d/ and its time derivative are required. Results obtained on the macrostructure of the interplanetary magnetic field, on the microstructure of discontinuities and shock wave, and on MHD and whistler waves in the interplanetary magnetoplasma are considered. Author (ESA)

N82-20100# Royal Observatory, Edinburgh (Scotland). Science and Research Council.
THE ROLE OF EPISODIC BOMBARDMENT IN GEOPHYSICS
S. V. M. Clube and W. M. Napier Nov. 1981 26 p refs Submitted for publication
Avail: NTIS HC A03/MF A01

The effects of cometary or asteroidal impacts on the boundary conditions at the core, outer mantle and atmosphere of the Earth are discussed through the literature. Impact episodes occur following the capture or orbital disturbance of these bodies

as the solar system passes through the spiral arms of the galaxy. There is thus a tendency for magnetic field reversals, principal plate movements, ice ages and mass extinctions to be correlated and to recur on time scales dictated by galactic processes. Major geophysical phenomena can thus be synthesized in a purely astronomical theory. Knowledge of the continuous state of the galaxy then becomes a prerequisite for the understanding of terrestrial history. Author (ESA)

N82-20101# Royal Observatory, Edinburgh (Scotland). Science and Engineering Council.
SPIRAL ARMS, COMETS AND TERRESTRIAL CATASTROPHISM
S. V. M. Clube and W. M. Napier Nov. 1981 45 p refs Submitted for publication
Avail: NTIS HC A03/MF A01

A hypothesis of terrestrial catastrophism in which comets grow in molecular clouds and are captured by the Sun as it passes through the spiral arms of the galaxy is reviewed. Assuming that comets are a major supplier of the Earth crossing (Apollo) asteroid population, the latter fluctuates correspondingly and leads to episodes of magnetic field reversal and tectonic activity, while surface phenomena lead to ice ages and mass extinctions. An episodic geophysical history with an interstellar connection is thus implied. If comets in spiral arms are necessary intermediaries in the process of star formation, the theory also sheds light on early solar system history and galactic chemistry. Author (ESA)

N82-20031# California State Univ., San Diego.
THE NEW PARADIGM IN COSMIC PLASMA PHYSICS
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 3-10 Sponsored in cooperation with Royal Inst. of Tech., Stockholm (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20033# Chicago Univ., Ill. Dept. of Physics.
THE MAGNETOHYDRODYNAMIC DYNAMO
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 23-29 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20034# Chicago Univ., Ill. Dept. of Physics.
THE NONEQUILIBRIUM OF MAGNETIC FIELDS
E. N. Parker *In* ESA Plasma Astrophys. Nov. 1981 p 31-35 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20035# Nagoya Univ. (Japan). Dept. of Astrophysics.
INTERSTELLAR MATTER
S. Hayakawa *In* ESA Plasma Astrophys. Nov. 1981 p 37-42 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20037# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
STABILITY OF THE EQUILIBRIUM STATES OF THE INTERSTELLAR GAS AND FIELD SYSTEM
Catherine J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 51-59 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20038# Academy of Sciences (USSR), Moscow. Inst. of Physics.
PLASMA EMISSION MECHANISMS AND ACCELERATION OF RELATIVISTIC PARTICLES IN COSMIC PLASMAS
V. N. Tsytovich *In* ESA Plasma Astrophys. Nov. 1981 p 61-75 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20049# Academy of Sciences (USSR), Moscow. Inst. of Space Research.
ORIGIN OF THE LARGE-SCALE STRUCTURE OF THE UNIVERSE
I. D. Novikov *In* ESA Plasma Astrophys. Nov. 1981 p 179-189 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20050# Massachusetts Inst. of Tech., Cambridge.
GALACTIC DYNAMICS AND GRAVITATIONAL PLASMAS
C. C. Lin and G. Bertin *In* ESA Plasma Astrophys. Nov. 1981 p 191-205 refs Sponsored by CNR and NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF Member States, AU, CN, and NO (+20% others)

N82-20056# California Univ., Berkeley. Dept. of Astronomy.
PULSAR THEORY: PARTICLE ACCELERATION AND PHOTON EMISSION IN THE POLAR FLUX TUBE
Jonathon Arons *In* ESA Plasma Astrophys. Nov. 1981 p 273-289 refs (For primary document see N82-20030 10-88) (Grant NSF AST-79-23243)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20057# Los Alamos Scientific Lab., N. Mex.
SUPERNOVA HYDRODYNAMICS
Stirling A. Colgate *In* ESA Plasma Astrophys. Nov. 1981 p 291-296 refs Sponsored by California Univ. and NSF Prepared in cooperation with New Mexico Inst. of Mining and Technology (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20058# Cambridge Univ. (England). Inst. of Astronomy.
HOT PLASMAS IN ACTIVE GALACTIC NUCLEI
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 297-301 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20059# Ecole Polytechnique, Palaiseau (France). Centre de Physique Theorique.
ON THE POSSIBILITY OF EXISTENCE OF LARGE AMPLITUDE WAVES AROUND PULSARS
Estelle Asseo *In* ESA Plasma Astrophys. Nov. 1981 p 309-312 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20064# Memorial Univ. of Newfoundland, St. Johns. Dept. of Mathematics and Statistics.
BONDI ACCRETION
D. Summers *In* ESA Plasma Astrophys. Nov. 1981 p 329-330 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20066# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
PULSAR MAGNETOSPHERE POTENTIAL STRUCTURE
Dean F. Smith, Lorant A. Muth, and Jonathan Arons (California Univ., Berkeley) *In* ESA Plasma Astrophys. Nov. 1981 p 333-335 refs Sponsored by NSF (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20068# Sterrewacht, Leiden (Netherlands).
A DOUGHNUT MODEL OF QUASARS
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 349-350 refs Sponsored by SERC (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20069# Sterrewacht, Leiden (Netherlands).
PLASMA BEAMS FROM DOUGHNUTS
P. M. Allan *In* ESA Plasma Astrophys. Nov. 1981 p 351-352 refs Sponsored by SERC (For primary document see N82-20030 10-88)

Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20075# Massachusetts Inst. of Tech., Cambridge.
FORMATION OF ION CONICS AND LOWER HYBRID ACCELERATION IN THE SUPRAURORAL REGION
Tom Chang and Bruno Coppi *In* ESA Plasma Astrophys. Nov. 1981 p 379-381 refs Sponsored by AFGL (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20077# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
INSTABILITIES IN INHOMOGENEOUS COLLISION-FREE SELF-GRAVITATING STELLAR SYSTEMS
Wolfgang Seboldt *In* ESA Plasma Astrophys. Nov. 1981 p 385-389 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20085# Academia Sinica, Peking (China). Inst. of Space Physics.
THE ANALYTICAL TRAJECTORY OF THE CHARGED PARTICLE MOVING IN A NEUTRAL SHEET MAGNETIC FIELD
Xu Rong-lan *In* ESA Plasma Astrophys. Nov. 1980 p 421-423 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-20102*# National Aeronautics and Space Administration, Washington, D. C.
NASA FACTS: IMAGES OF SATURN FROM VOYAGER 2
1981 4 p refs Original contains color illustrations
(NASA-NF-132/10-81) Avail: NTIS HC A01; SOD HC $2.00 CSCL 03B

Six color images of Saturn and four of her moons, acquired by Voyager 2, are presented. A brief narrative and explanatory captions, including explanations of the planet's atmosphere and rings, are presented. N.W.

N82-20103*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE TROPOSPHERIC GAS COMPOSITION OF JUPITER'S NORTH EQUATORIAL BELT (NH3, PH3, CH3D, GeH4, H2O) AND THE JOVIAN D/H ISOTROPIC RATIO
V. Kunde, R. Hanel, W. Maguire, D. Gautier, J. P. Baluteau, A. Marten, A. Chedin, N. Husson, and N. Scott Feb. 1982 70 p refs Prepared in cooperation with Observatoire de Paris-Meudon and Ecole Polytechniques, Palaiseau Submitted for publication
(NASA-TM-83891) Avail: NTIS HC A04/MF A01 CSCL 03B

The gas composition of the troposphere of Jupiter in the clearest regions of the North Equatorial Belt (NEB) was derived from the Voyager 1 IRIS data. The infrared spectrum for this homogeneous cloud free region was modeled to infer altitude profiles for NH3, PH3, GeH4 and H2O. The Profiles for NH3 and PH3 were found to be depleted in the upper tropsphere but otherwise in agreement with their solar values at the 1 bar level. The mole fraction for CH3D was determined to be 3.5(+1.0 or -1.3) x 10 to the minus 7th power. The GeH4 mole fraction of 7+ or -2 x 10 to the minus 10th power at the 2 to 3 bar level is a factor of 10 lower than the solar value. The H2O mole fraction is approximately 1 x 0.00001 at the 2.5 bar level and is increasing to approximately 3 x 0.00001 at 4 bars where it is a factor of 30 lower than solar. Using IRIS infrared values for the mole fractions of CH3D and CH4 a value of D/H = 3.6(+1.0 or -1.4)x 0.00001 is derived. Assuming this Jovian D/H ratio is representative of the protosolar nebula, and correcting for chemical galactic evolution, yields a value of 5.5 - 9.0 x 0.00001 for the primordial D/H ratio and an upper limit of 1.8 to 2.4 x 10 to the minus 31st power cu cm for the present day baryon density. Author

N82-20104*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVIDENCE FOR SOLAR WIND CONTROL OF SATURN RADIO EMISSION
Michael D. Desch Feb. 1982 22 p refs Submitted for publication
(NASA-TM-83889) Avail: NTIS HC A02/MF A01 CSCL 03B

Using data collected by the Voyager 1 and 2 spacecraft in 1980 and 1981, strong evidence is presented for a direct correlation between variations in the solar wind at Saturn and the level of activity of Saturn's nonthermal radio emission. Correlation coefficients of 57 to 58% are reached at lag times of 0 to 1 days between the arrival at Saturn of high pressure solar wind streams and the onset of increased radio emission. The radio emission exhibits a long-term periodicity of 25 days, identical to the periodicity seen in the solar wind at this time and consistent with the solar rotation period. The energy coupling efficiency between the solar wind with the Saturn radio emission is estimated and compared with that for Earth. R.J.F.

N82-20105*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MAGNETIC FIELD MEASUREMENTS AT JUPITER BY VOYAGERS 1 AND 2: DAILY PLOTS OF 48 SECOND AVERAGES
Ronald P. Lepping, Mark J. Silverstein, and Norman F. Ness Nov. 1981 82 p refs
(NASA-TM-83864) Avail: NTIS HC A05/MF A01 CSCL 03B

A series of 24 hour summary plots of the magnetic field, in 48-s average form, measured in the vicinity of Jupiter by the magnetometers onboard Voyagers 1 and 2 are presented. The Voyager 1 data cover the period from 27 February 1979 (day = 58) to 23 March (day = 82) inclusive, and the Voyager 2 data cover the period from 2 July 1979 (day = 183) to 14 August (day = 226) inclusive. Closest approach to the planet occurred on days 64 (AT 1205 UT) and 190 (AT 2230 UT) for Voyagers 1 and 2, respectively. Also included are: a description of the characteristics of the magnetometers, a brief description of the near-planet trajectories of the two spacecraft, a listing of the bow shock and magnetopause crossing times, and a bibliography containing Voyager-Jupiter related papers and reports. B.W.

N82-20032# Royal Inst. of Tech., Stockholm (Sweden).
THE VOYAGER 1 SATURN ENCOUNTER AND THE COSMOGONIC SHADOW EFFECT
H. Alfven *In* ESA Plasma Astrophys. Nov. 1981 p 11-21 refs Prepared in cooperation with California State Univ., San Diego (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20045*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
PLASMA DYNAMICS IN THE RAPIDLY ROTATING MAGNETOSPHERE OF JUPITER
John W. Belcher *In* ESA Plasma Astrophys. Nov. 1981 p 129-134 refs (For primary document see N82-20030 10-88)
(Contract JPL-953733; Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-20106*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ACCRETION DISK CORONAE
N. E. White (Maryland Univ., College Park) and S. S. Holt Oct. 1981 60 p refs Submitted for publication
(NASA-TM-83840) Avail: NTIS HC A04/MF A01 CSCL 03B

Recent observations of partial X-ray eclipses from 4U1822-37 have shown that the central X-ray source in this system is diffused by a large Compton-thick accretion disk corona (ADC). Another binary, 4U2129-47, also displays a partial eclipse and contains an ADC. The possible origin of an ADC is discussed and a simple hydrostatic evaporated ADC model is developed which, when applied to 4U1822-37, 4U2129+47 and Cyg X-3, can explain their temporal and spectral properties. The quasi-sinusoidal modulation of all three sources can be reconciled with the partial occultation of the ADC by a bulge at the edge of the accretion disk which is caused by the inflowing material. The height of this bulge is an order of magnitude larger than the hydrostatic disk height and is the result of turbulence in the outer region of the disk. The spectral properties of all three sources can be understood in terms of Compton scattering of the original source spectrum by the ADC. Spectral variations with epoch in Cyg X-3 are probably caused by changes in the optical depth of the corona. A consequence of our model is that any accreting neutron star X-ray source in a semi-detached binary system which is close to its Eddington limit most likely contains an optically thick ADC. Author

N82-20107# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 443. PART 1: (PROMPT REPORTS). DATA FOR JUNE 1981, MAY 1981
Helen E. Coffey Jul. 1981 167 p refs 2 Vol.
(PB82-113853; SGD-443-Pt-1; NOAA-81082602) Avail: NTIS HC A08/MF A01 CSCL 03B

Data from June 1981 on alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, coronal holes, interplanetary magnetic field polarities, mean solar magnetic field, and spacecraft observations, are provided in addition to the Boulder geomagnetic substorm log. Daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays for May 1981 are given. Late data include solar radio emission for April 1981, cosmic rays for April 1981, geomagnetic indices for April 1981, and radio propagation indices for March 1981. GRA

N82-20108# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 443. PART 2: (COMPREHENSIVE REPORTS). DATA FOR JANUARY 1981, DECEMBER 1979
Helen E. Coffey Jul. 1981 73 p 2 Vol.
(PB82-113861; SGD-443-Pt-2; NOAA-81082603) Avail: NTIS HC A04/MF A01 CSCL 03B

Data on solar radio emission, solar X-ray radiation, and mass ejections from the Sun are given for occurrences in January 1981. Data on solar flares for December 1979 are given. Miscellaneous data include: mass ejections from the Sun for December 1980, energetic solar particles and plasma for August to November 1980, and the regional flare index for November 1979. GRA

N82-20044# Utrecht State Univ. (Netherlands). Inst. of Astronomy.
HEATING PROCESSES OF THE SOLAR CORONA
M. Kuperus *In* ESA Plasma Astrophys. Nov. 1981 p 113-128 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20046*# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
INFERENCES ABOUT THE SOLAR WIND DYNAMICS FROM OBSERVED DISTRIBUTIONS OF ELECTRONS AND IONS
Stanislaw Olbert *In* ESA Plasma Astrophys. Nov. 1981 p 135-143 refs (For primary document see N82-20030 10-88)
(Grant NGR-22-009-015)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+ 20% others) CSCL 03B

N82-20048# European Space Research and Technology Center, Noordwijk (Netherlands). Space Science Dept.
THE INTERNATIONAL SOLAR POLAR MISSION (ISPM)
R. G. Marsden and K.-P. Wenzel *In* ESA Plasma Astrophys. Nov. 1981 p167-175 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20079# Ruhr Univ., Bochum (West Germany). Inst. fuer Theoretische Physik.
QUASISTATIC EVOLUTION OF PREFLARE EQUILIBRIA
Wolfgang Zwingmann *In* ESA Plasma Astrophys. Nov. 1981 p 297-400 refs Sponsored by Deutsche Forschungsgemeinschaft (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20080*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
LARGE LOOP THERMAL MODELS OF SOLAR HARD X-RAY BURSTS
Dean F. Smith and D. W. Harmony *In* ESA Plasma Astrophys. Nov. 1981 p 401-404 refs Co-sponsored with NSF (For primary document see N82-20030 10-88)
(Grant NsG-7505)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20081# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
WAVE HEATING AND ACCELERATION OF SOLAR WIND IONS BY CYCLOTRON RESONANCE
Eckart Marsch *In* ESA Plasma Astrophys. Nov. 1981 p 405-406 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-20109*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EXTRAGALACTIC GAMMA RADIATION: USE OF GALAXY COUNTS AS A GALACTIC TRACER
D. J. Thompson and C. E. Fichtel Feb. 1982 13 p refs Submitted for publication
(NASA-TM-83901) Avail: NTIS HC A02/MF A01 CSCL 03B

A derivation of the extragalactic diffuse gamma radiation with energies above 35 MeV was carried out using galaxy counts as a tracer of galactic matter. The extragalactic radiation has a differential photon number spectrum which may be expressed as a power law with index 2.35 (+0.4, -0.3) and an intensity above 35 MeV of (5.5 + or - 1.3) 0.00001 photons sq cm/s/ster, consistent with previous derivations. Use of a 1/sin of the absolute value of b expression of the galactic component produces a poorer fit, suggesting that the high-latitude galactic gamma-ray production may be dominated by cosmic ray interactions with matter rather than by Compton interactions of cosmic rays with photon fields. B.W.

N82-20110*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRECISE SOURCE LOCATION OF THE ANOMALOUS 1979 MARCH 5 GAMMA RAY TRANSIENT
T. L. Cline, U. D. Desai, B. J. Teegarden, W. D. Evans, R. W. Klebesadel, J. G. Laros, C. Barat, K. Hurley, M. Niel, G. Vedrenne et al Dec. 1981 16 p refs Prepared in cooperation with NASA. Marshall Space Flight Center, LASL, CNRS and the Inst. of Space Research and Center for Astrophysics Submitted for publication
(NASA-TM-83884) Avail: NTIS HC A02/MF A01 CSCL 03B

Refinements in the source direction analysis of the observations of the unusual gamma ray transient are presented. The final results from the interplanetary gamma ray burst network produce a 0.1 arc sq. min. error box. It is nested inside the initially determined 2 arc sq min. source region. This smaller source location is within both the optical and X-ray contours of N49 although not positioned at either contour center. M.D.K.

N82-20111*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON THE THEORY OF GAMMA RAY AMPLIFICATION THROUGH STIMULATED ANNIHILATION RADIATION (GRASAR)
R. Ramaty, J. M. McKinley (Oakland Univ.), and F. C. Jones Nov. 1981 36 p refs Submitted for publication
(NASA-TM-83857) Avail: NTIS HC A03/MF A01 CSCL 03B

The theory of photon emission, absorption, and scattering in a relativistic plasma of positrons, electrons, and photon was studied. Expressions for the emissivities and absorption coefficients of pair annihilation, pair production, and Compton scattering are given and evaluated numerically. The conditions for negative absorption were investigated. In a system of photons and e(+) - e(-) pairs, an emission line at at approximately 0.43 MeV can be produced by grasar action provided that the pair chemical potential exceeds approximately 1 MeV. At a temperature of approximately 10 to the 9th power. This requires a pair density > approximately 10 to the 30th power cm to the (-3) power a value much larger than the thermodynamic equilbrium pair density at this temperature. This emission line could account without a gravitational redshift for the observed lines at this energy from gamma ray bursts. Author

N82-20112*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GODDARD CONTRIBUTIONS TO THE WORKSHOP ON GAMMA RAY TRANSIENTS
Aug. 1981 84 p refs Conf. held at La Jolla, Calif., 5-8 Aug. 1981
(NASA-TM-83816) Avail: NTIS HC A05/MF A01 CSCL 03B

Six articles addressing cosmic and solar gamma ray transients are presented. The topics covered include: gamma ray lines from solar flares and cosmic transients including burst spectra; a review of the 1979 March 5 transient; time variation in the 511 KeV flux observed by the ISEE spectrometer; time variations of an absorption feature in the spectrum of the burst on 1980 April 19; and the theory of gamma ray amplification through stimulated annihilation radiation. M.G.

N82-20042# Rome Univ. (Italy). Ist. Astronomico.
RADIATION PROCESSES IN ACTIVE GALACTIC NUCLEI
A. Cavaliere *In* ESA Plasma Astrophys. Nov. 1981 p 97-103 refs Sponsored by CNR (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20043# Princeton Univ., N. J. Dept. of Astrophysical Sciences.
PARTICLE ACCELERATION
Russell M. Kulsrud *In* ESA Plasma Astrophys. Nov. 1981 p 105-109 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20051# California Inst. of Tech., Pasadena.
EXTRAGALACTIC RADIO SOURCES
R. D. Blandford *In* ESA Plasma Astrophys. Nov. 1981 p 207-214 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20052# Cornell Univ., Ithaca, N. Y. Dept. of Applied Physics.
EXTRAGALACTIC DOUBLE RADIO SOURCES
R. V. E. Lovelace and H. A. Scott *In* ESA Plasma Astrophys. Nov. 1981 p 215-221 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20055# Cambridge Univ. (England). Inst. of Astronomy.
PRODUCTION AND PROPAGATION OF JETS
Martin J. Rees *In* ESA Plasma Astrophys. Nov. 1981 p 267-271 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20060*# Maryland Univ., College Park. Dept. of Physics and Astronomy.
ELECTRON ACCELERATION IN MAGNETOSONIC SHOCK FRONTS
K. Papadopoulos *In* ESA Plasma Astrophys. Nov. 1981 p 313-315 refs (For primary document see N82-20030 10-88) (Grant NAGw-81; Contract N00014-79-C-0665)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20061# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
HIGH ENERGY COSMIC RAY ACCELERATION BY DIFFUSIVE SHOCKS
P. O. Lagage and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 317-318 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20062# Commissariat a l'Energie Atomique, Saclay (France). Section d'Astrophysique.
COSMIC RAY ACCELERATION BY STELLAR WINDS AND SELF-CONFINEMENT IN GIANT H2 REGIONS
T. Montmerle and C. J. Cesarsky *In* ESA Plasma Astrophys. Nov. 1981 p 319-322 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20067# Cambridge Univ. (England). Inst. of Astronomy.
ION PRESSURE-SUPPORTED ACCRETION TORI AND THE ORIGIN OF RADIO JETS. A PLEA FOR SPECIFIC ADVICE ON THE PLASMA PHYSICS
E. S. Phinney *In* ESA Plasma Astrophys. Nov. 1981 p 337-341 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20070# Turin Univ. (Italy). Ist. di Fisica Generale.
LARGE SCALE KELVIN-HELMHOLTZ INSTABILITIES IN EXTRAGALACTIC RADIO JETS
A. Ferrari and E. Trussoni *In* ESA Plasma Astrophys. Nov. 1981 p 353-357 refs Prepared in cooperation with CNR, Turin (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20073*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
CONFINEMENT OF COSMIC RAYS IN MOLECULAR CLOUDS
Ellen G. Zweibel and J. Michael Shull (Joint Inst. for Laboratory Astrophysics) *In* ESA Plasma Astrophys. Nov. 1981 p 371-373 refs Co-sponsored by NASA (For primary document see

N82-20030 10-88)
(Grant NSF AST-80-19960)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others) CSCL 03B

N82-20074# Lodz Univ. (Poland).
CERTAIN ASPECTS OF PRIMARY COSMIC RAYS COMPOSITION AT ENERGIES OF 10 TO THE 14TH POWER TO 10 TO THE 15TH POWER eV
J. Kempa *In* ESA Plasma Astrophys. Nov. 1981 p 375-376 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20076# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ON THE EXISTENCE OF THE ION TEARING MODE
H. Goldstein *In* ESA Plasma Astrophys. Nov. 1981 p 383-384 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

N82-20086# Max-Planck-Institut fuer Aeronomie, Katlenburg-Lindau (West Germany).
ACCELERATION OF COSMIC RAYS BY SHOCK WAVES
W. I. Axford *In* ESA Plasma Astrophys. Nov. 1981 p 425-449 refs (For primary document see N82-20030 10-88)
Avail: NTIS HC A24/MF A01; ESA, Paris FF 125 Member States, AU, CN, and NO (+20% others)

99 GENERAL

N82-20113*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TELECOMMUNICATIONS AND DATA ACQUISITION REPORT Progress Report, Nov. - Dec. 1981
N. A. Renzetti, ed. 15 Feb. 1982 140 p refs Sponsored by NASA
(NASA-CR-168577; JPL-PR-42-67) Avail: NTIS HC A07/MF A01 CSCL 22D

Progress in the development and operations of the Deep Space Network is reported. Developments in Earth-based radio technology as applied to other research programs are also reported. These programs include geodynamics, astrophysics, and radio searching for extraterrestrial intelligence in the microwave region of the electromagnetic spectrum. For individual titles, see N82-20114 through N82-20130.

N82-20114*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SETI DOWNCONVERTER **c33**
B. Crow *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 1-5 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09C

The SETI (Search for Extraterrestrial Intelligence) breadboard subsystem was begun in order to develop the technology to efficiently implement a SETI instrument capable of searching wide bandwidth with high resolution. The downconverter covered is the interface hardware between the receiver IF output and ADC used as the input to the spectrum analyzer. Author

N82-20115*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DSN RADIO SCIENCE SYSTEM MARK 3, 1980 **c32**
B. J. Buckles *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 6-11 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17B

The DSN Radio Science System supported the Voyager 2 Saturn encounter radio science experiments in August 1981. Support for these experiments was provided by all the Deep Space Stations of the DSN. However, the critical support for the Saturn occultation and ring scattering experiment was provided at DSS 43 by the medium-band open-loop recording system. The DSN Radio Science System is descried and the recent implementation at DSS 43 is emphasized. Author

N82-20116*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
A SUMMARY OF SPACE FLIGHT MISSIONS SUPPORTED BY THE DEEP SPACE NETWORK **c12**
E. S. Burke *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 13-17 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22A

Since the Ranger series in the 1960s the DSN evolved to a highly sophisticated telecommunications and data acquisition network. The 26 meter antennas were converted to 34 meters, and 64 meter antennas were built at all complexes. The L-band systems were changed to S-band, with X-band now also being used on Voyager and Pioneer 12. Ranging systems were developed and are used along with other techniques to determine exact spacecraft locations. Each mission is summarized and the launch date, objective, and results are presented. T.M.

N82-20117*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
HELIOS MISSION SUPPORT **c14**
A. L. Berman, C. T. Stelzried, B. L. Seidel, J. C. Nash, and R. E. Nevarez *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 18-23 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 22D

Ongoing Deep Space Network support of the Helios 1 spacecraft is described. In addition, planning for a Solar Corona Faraday Rotation Experiment during the December 1981 14th Helios 1 perihelion and subsequent solar conjunction phase is detailed. Author

N82-20118*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE DEVELOPMENT OF A MAGNETICALLY ENHANCED HYDROGEN GAS DISSOCIATION **c36**
L. Maleki and T. K. Tucker *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 24-28 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

Application of a dc magnetic field on an RF hydrogen gas dissociator led to the development of a more efficient source of atoms for hydrogen masers. The influence of the applied magnetic field on the plasma and some details of the resulting enhancement of the dissociation efficiency are discussed. Ways that this improved efficiency can result in the enhancement of the operation and field life of hydrogen masers, as well as aid the development of spaceborne masers, are considered. Author

N82-20119*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAGNETIC REFRIGERATION FOR MASER AMPLIFIER COOLING **c36**
D. L. Johnson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 29-38 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20E

The development of a multifrequency upconverter-maser system for the DSN has created the need to develop a closed-cycle refrigerator (CCR) capable of providing more than 3 watts of refrigeration capability at 4.5 K. In addition, operating concerns such as the high cost of electrical power consumption and the loss of maser operation due to CCR failures require that improvements be made to increase the efficiency and reliability of the CCR. One refrigeration method considered is the replacement of the Joule-Thomson expansion circuit with a magnetic refrigeration. Magnetic refrigerators can provide potentially reliable and highly efficient refrigeration at a variety of temperature ranges and cooling power. The concept of magnetic refrigeration is summarized and a literature review of existing magnetic refrigerator designs which have been built and tested and that may also be considered as possibilities as a 4 K to 15 K magnetic refrigeration stage for the DSN closed-cycle refrigerator is provided. T.M.

N82-20120*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SIDEBAND-AIDED RECEIVER ARRAYING **c32**
S. A. Butman, L. J. Deutsch, R. G. Lipes, and R. L. Miller *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 39-54 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17B

Efforts to increase the amount of data that can be received from outer planet missions by coherently combining signals from ground antennas in such a way as to increase the total effective aperture of the receiving system are discussed. As these signals become weaker, the baseband arraying technique in current use degrades somewhat due to carrier jitter. One solution to this problem is Sideband-Aided Receiver Arraying (SARA). In SARA, sidebands demodulated to baseband in a master receiver at the largest antenna are used to allow slave receivers in the other antennas to track the sideband power in the signal rather than the carrier power. The already existing receivers can be used in the slaves to track and demodulate the signals in either a residual carrier or a suppressed carrier environment. The resultant baseband signals from all the antennas can then be combined using existing baseband combining equiment. Computer simulations of SARA show increases in throughput (measured in data bits per second) over baseband-only combining 17 percent at Voyager 2 Uranum encounter and 31 percent at Neptune for a four-element antenna array and (7, 1/2) convolutional coding. Author

N82-20121*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CAPACITY LIMIT OF THE NOISELESS, ENERGY-EFFICIENT OPTICAL PPM CHANNEL **c74**
J. R. Lesh *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 54-58 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20F

It is shown that even though the capacity per photon can be made to increase without bound, the capacity per channel use (for best power efficiency) is always less than 2 nats per symbol. Furthermore, it approaches 2 nats per symbol as the bandwidth expansion factor goes to infinity. T.M.

N82-20122*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ON THE GROUP DELAY EFFECT OF DSN MICROWAVE COMPONENTS ON MULTIMEGABIT TELEMETRY **c17**
P. J. Lee *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 59-65 ref (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09F

When the gain and phase shift characteristics of the overall system between the modulator and demodulator are given, the group delay effect for the intended data rate can be assessed by examining the equation for the recovered signal for several rectangular pulse inputs with different duty cycles. For example, the group delay loss of 30 Mbit/sec telemetry with only a Block II X-band maser is less than 0.2 dB even with a 10-MHz center frequency offset. Author

N82-20123*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
IMPROVING THE COMPUTER-HUMAN INTERFACE: THE QUALITATIVE MONITOR DISPLAY **c60**
H. W. Baugh and A. I. Zygielbaum *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 66-69 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 09B

A technique for displaying the information needed by DSN operators for monitoring station performance is described. Known as a 'qualitative monitor,' it presents continuous variables in quasi-analog form on a digital cathode ray tube (CRT) display. Color changes, field reverses and blinking symbols assist the operator in identifying variables that are within acceptable limits and in performing corrective action when needed. Author

N82-20124*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MASTER TIMING SYSTEM MEASUREMENTS **c35**
E. F. Endsley *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 70-74 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14B

The test results indicate that the system performs within the specifications established. The overall system appears to be well designed and built to a good commercial grade. The triple redundant time code generators, whose outputs are majority voted, performed adequately as far as could be determined on an operational situation. T.M.

N82-20125*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OPTIMUM EQUIPMENT MAINTENANCE/REPLACEMENT POLICY. PART 2: MARKOV DECISION APPROACH **c38**
T. Charng *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 75-89 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

Dynamic programming was utilized as an alternative ootimization technique to determine an optimal policy over a given time period. According to a joint effect of the probabilistic transition of states and the sequence of decision making, the optimal policy is sought such that a set of decisions optimizes the long-run expected average cost (or profit) per unit time. Provision of an alternative measure for the expected long-run total discounted costs is also considered. A computer program based on the concept of the Markov Decision Process was developed and tested. The program code listing, the statement of a sample problem, and the computed results are presented. Author

N82-20126*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GLOBAL POSITIONING SYSTEM TIMING RECEIVERS IN THE DSN **c04**
P. A. Clements *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 90-99 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 17G

The system (GPS) is a worldwide navigation system using a constellation of Earth satellites with onboard clocks. The GPS is also usable to transfer time and frequency. Preliminary tests with the breadboard receiver at NBS produced precision in time and frequency transfer between the United States Naval Observatory (USNO) and NBS. JPL's plans to install receivers in the DSN to demonstrate their ability to transfer time and frequency within the DSN and between the DSN and outside agencies are discussed. T.M.

N82-20127*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NOISE TEMPERATURE AND NOISE FIGURE CONCEPTS: DC TO LIGHT **c32**
C. T. Stelzried *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 100-111 refs (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20N

The Deep Space Network is investigating the use of higher operational frequencies for improved performance. Noise temperature and noise figure concepts are used to describe the noise performance of these receiving systems. It is proposed to modify present noise temperature definitions for linear amplifiers so they will be valid over the range $(hf/kT) < 1 < (hf/kT)$. This is important for systems operating at high frequencies and low noise temperatures, or systems requiring very accurate calibrations. The suggested definitions are such that for an ideal amplifier, T sub e = (hg/k) = T sub q and F = 1. These definitions revert to the present definition for $(hf/kT) < < 1$. Noise temperature calibrations are illustrated with a detailed example. These concepts are applied to system signal-to-noise analysis. The fundamental limit to a receiving system sensitivity is determined by the thermal noise of the source and the quantum noise limit of the receiver. The sensitivity of a receiving system consisting of an ideal linear amplifier with a 2.7 K source, degrades significantly at higher frequencies. Author

N82-20128*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TIGER RELIABILITY ANALYSIS IN THE DSN **c38**

J. M. Gunn *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 112-120 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

The TIGER algorithm, the inputs to the program and the output are described. TIGER is a computer program designed to simulate a system over a period of time to evaluate system reliability and availability. Results can be used in the Deep Space Network for initial spares provisioning and system evaluation. T.M.

N82-20129*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SPECIAL ACTIVITY UTILIZATION OF GDSCC ANTENNAS DURING 1981 c32
E. B. Jackson *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 121-126 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 20N

The activities are categorized as advanced systems program, radio astronomy program, crustal dynamics program, and operations and support activities. The goals of each of the activities that received tracking support at Goldstone during 1981 are discussed. All Goldstone stations (DSSs 11, 12, 13 and 14) provided a total of 2353.55 hours of support to special activities during the period. T.M.

N82-20130*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MAINTENANCE AND OPERATIONS TASKS ACCOMPLISHED AT DSS 12 DURING THE ANTENNA PANEL REPLACEMENT DOWNTIME c38
L. Butcher, T. Jonas, and W. Wood *In its* The Telecommun. and Data Acquisition Rept. 15 Feb. 1982 p 127-128 (For primary document see N82-20113 10-99)
Avail: NTIS HC A07/MF A01 CSCL 14D

The heavy schedule of tracking activities at the Echo Deep Space Station (DSS 12) prevents some time-consuming maintenance tasks from being performed. Careful coordination prior to and during a mandatory task (antenna panel replacement) made it possible to do a large number of unrelated tasks that ordinarily would have to be deferred. The maintenance and operations tasks accomplished during the downtime are described. Author

N82-20131# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
LA RECHERCHE AEROSPATIALE, BI-MONTHLY BULLETIN NUMBER 1981-4, JULY - AUGUST 1981
Claude Sevestre, ed. Paris ESA Nov. 1981 68 p refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-294 Sponsored by ESA
(ESA-TT-722) Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Advances in calculation and simulation methodology reported include: (1) determination of a compressor transfer function; (2) modeling of Reynolds stress equations in a rotating reference system; (3) a two-step implicit scheme for the solution of a conservation equation; (4) determination of temperature/velocity probability density functions in a turbulent flame; (5) modeling aircraft IR radiation; and (6) computer controlled structural vibration simulation. For individual titles, see N82-20132 through N82-20137.

N82-20132# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
THEORETICAL AND EXPERIMENTAL DETERMINATION OF A COMPRESSOR TRANSFER FUNCTION c02
J. Fabri and J. Paulon *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 1-8 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 223-231 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

The physical meaning of compressor transfer functions proposed in the technical literature was examined. None of them correctly explains the transient phenomena observed during transient tests of a single stage compressor submitted to a pressure step. Measurement of the evolutions of wall pressure on an axial compressor submitted to a flow step demonstrated a certain number of facts which have to be taken into account when studying the operation of compressors under transient conditions. An analysis of the equations of momentum and continuity through the compressor, which allows for the action of the blades on the fluid, gives a theoretical scheme that is closer to the experimental results. The best theoretical/experimental cross checks are obtained assuming that the acceleration of the fluid under the effect of volume forces satisfies a relaxation equation involving the history (memory) of the phenomenon. Author (ESA)

N82-20133# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
EXPERIMENTAL DETERMINATION OF TEMPERATURE/VELOCITY PROBABILITY DENSITY FUNCTIONS IN A TURBULENT FLAME c25
P. Moreau *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 9-20 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 233-244 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Optical measurements of velocity by laser velocimetry, and temperature by infrared pyrometry were performed in a combustion chamber in which a premixed air-methane flow was ignited by a parallel flow of hot gases. The mean velocity and velocity fluctuation profiles show the influence of inlet turbulence and velocity ratio on flame development. The velocity probability density functions reveal various zones in the flow: fresh mixture, mixing and combustion zone, and burnt gases. The temperature histograms obtained give similar results. Author (ESA)

N82-20134# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
AIRCRAFT INFRARED RADIATION MODELING c74
G. Gauffre *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 21-41 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 245-265 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Numerical modeling of aircraft IR emission comprised two phases: research of the main physical phenomena which are involved, and the development of calculation techniques capable of numerically resolving the problems which were identified. A software package is offered. The major processes taken into account are heating sources, geometrical representation and obscuration, plume description, infrared emittance of solids and gases, atmospheric transmission, and background. The input data are geometrical description of target, flight parameters and observation system. The code states the origin of radiation and the spectral distribution. The results can be exploited as an intensity function of range or polar diagrams. Author (ESA)

N82-20135# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
SIMULATION USING COMPUTER-PILOTED POINT EXCITATIONS OF VIBRATIONS INDUCED ON A STRUCTURE BY AN ACOUSTIC ENVIRONMENT c71
P. Monteil *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 43-49 Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 267-273 (For primary document see N82-20131 10-99)
Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Computation of the overall levels and spectral densities of the responses measured on a launcher skin, the fairing for instance, merged into a random acoustic environment during take off, was studied. The analysis of transmission of these vibrations to the payload required the simulation of these responses by a shaker control system, using a small number of distributed shakers. Results show that this closed loop computerized digital system

allows the acquisition of auto and cross spectral densities equal to those of the responses previously computed. However, wider application is sought, e.g., road and runway profiles. The problems of multiple input-output system identification, multiple true random signal generation, and real time programming are evoked. The system should allow for the control of four shakers.

Author (ESA)

N82-20136# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

REYNOLDS STRESS EQUATIONS MODELING IN A ROTATING REFERENCE SYSTEM **c39**

J. Cousteix and B. Aupoix *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 51-60 refs Transl. into ENGLISH of La Rech. Aerospatiale, Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 275-285 (For primary document see N82-20131 10-99)

Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

Simplifying hypotheses for analyzing the effect of rotation on the behavior of turbulent stresses are introduced. Two particular cases are considered: (1) a two dimensional boundary layer rotating around a flow with its axis perpendicular to the plane of the flow and (2) a three dimensional boundary layer rotating around an axis perpendicular to the wall. In the first case, stabilization or destabilization of the turbulence appears to depend on the direction of rotation. In the second, the effect of rotation is a misalignment between the turbulent shearing stress and the derivative of the mean velocity, following the coordinate normal to the wall. Author (ESA)

N82-20137# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).

TWO-STEP IMPLICIT SCHEMES FOR THE SOLUTION OF A CONSERVATION EQUATION **c64**

H. Hollanders and R. Peyret *In its* La Rech. Aerospatiale, Bi-monthly Bull. No. 1981-4, Jul. - Aug. 1981 (ESA-TT-722) Nov. 1981 p 61-67 refs Transl. into ENGLISH of La Rech. Aerospatiale Bull. Bimestriel (Paris), No. 1981-4, Jul. - Aug. 1981 p 287-294 (For primary document see N82-20131 10-99)

Avail: NTIS HC A04/MF A01; original report in FRENCH available at ONERA, Paris FF 45

A class of two-step implicit schemes, generalizing an implicit predictor-corrector type scheme to solve evolution equations with application to Navier-Stokes equations for compressible fluids, is considered. The class is constructed on the basis of two-step explicit (S beta alpha) schemes which are explicit at the first step, implicit at the second in the centered case alpha = beta = 1/2. MacCormack implicit schemes, alpha = 1 and beta = 0 or beta = 1, are emphasized. These schemes are applied to the solution of a hyperbolic equation. The dispersive and dissipative properties of these schemes are deduced from a study of the equivalent equation. Numerical experiments are carried out, relating to the problem of the propagation of a discontinuity. Results show that the MacCormak bidiagonal resolution scheme, and the centered scheme based on the optimal explicit alpha = 1 + the square root of 5/2 and on an implicit operator, deduced either from a subclass of explicit-implicit schemes or from Lerat's one-step scheme are interest for representing discontinuity

Author (ESA)

N82-20138# Office of Naval Research, London (England).

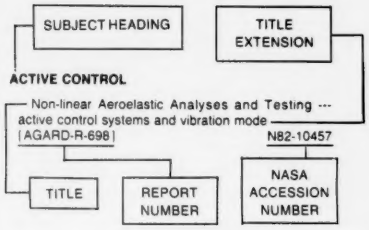
EUROPEAN SCIENTIFIC NOTES, VOLUME 35, NUMBER 11 Monthly Publication Report, 30 Nov. 1981

Francis A. Richards, ed. and Don J. Peters, ed. 30 Nov. 1981 37 p

(AD-A109387; ESN-35-11) Avail: NTIS HC A03/MF A01 CSCL 05/1

A collection of articles on recent developments in European scientific research is presented. The following topics are discussed: Artificial and Human Intelligence; Organizational Change in Merchant Shipping; Unit of Blood Pressure: Protecting the Millimeter of Mercury; Third International Symposium on Inorganic Ring Systems; NATO Advanced Research Institute on Surface Modification and Alloying of Materials by Direct Energy Processing; and FRAM Ice Floe Stations. E.A.K.

Typical Subject Index Listing



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Underwater shock analysis of nonlinear structures, a reference manual for the USA-STAGS code, version 3 [AD-A108911] N82-19584

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BIBLIOGRAPHIES
Aeronautical Engineering: A continuing bibliography (supplement 143)
[NASA-SP-7037(143)] N82-19131
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
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[VTH-LR-321] N82-19315
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COMMERCIAL AIRCRAFT
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
FAA statistical handbook of aviation
[AD-A109289] N82-19198
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225

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Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft N82-19277
Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft: Conclusions N82-19278
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[INPE-2300-TDL/071] N82-19425
SATNET development and operation. Pluribus satellite IMP development. Remote site maintenance. Internet operations and maintenance. Mobile access terminal network. TCP for the HP3000. TCP-TAC. TCP for VAX-UNIX. Combined quarterly technical report
[AD-A108783] N82-19432
Unbounded speed variability in distributed communications systems
[AD-A108824] N82-19437
Synthesis of communicating processes from temporal logic specifications
[AD-A109853] N82-19866

COMMUNICATION SATELLITES
ANIK-B program delivery pilot project. A 12 month performance assessment
[CRC-1349] N82-19426
Direct broadcast satellites: Policies, prospects, and potential competition
[PB82-110164] N82-19446

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[NASA-CR-168586] N82-19169
Applications of a general comparison theory for convolution integrals
[CTH-MATH-1981-21] N82-19923

COMPILERS
Los Alamos Scientific Laboratory computer benchmark performance 1979
[LA-8689-MS] N82-19849
ALGOL-MS, a language for the development of multiprogrammed small systems
[INPE-2282-TDL/067] N82-19875

COMPLEX NUMBERS
Computational advances in large-scale nonlinear optimization
[AD-A109528] N82-19917

COMPOSITE MATERIALS
The science and engineering of materials
[INPE-2138-RPE/361] N82-19316
Percolation and conduction phenomena in disordered composite media N82-19331
Numerical simulation of reinforced concrete subjected to multiaxial stress conditions N82-19554
Time dependent inelastic behavior of materials
[AD-A109089] N82-19585
Preliminary analysis of accelerated space flight ionizing radiation testing
[NASA-TM-83209] N82-19969

COMPRESSIBILITY EFFECTS
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[AD-A109000] N82-19393

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[NASA-TP-1974] N82-19222

COMPRESSOR ROTORS
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222
High-speed laser anemometer system for intrarotor flow mapping in turbomachinery
[NASA-TP-1663] N82-19521

COMPRESSORS
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391

COMPTON EFFECT
Hot plasmas in active galactic nuclei --- radiative processes N82-20058
Electron kinetic equations in comptonization by isotropic photons N82-20065
Spectral and temporal behavior of the X-ray binary stars Cgy X-1 in the hard X-ray domain
[MPI-PAE/EXTRATERR-166] N82-20091
HEAO 1 measurements of the galactic ridge
[NASA-TM-83844] N82-20097
On the theory of Gamma Ray Amplification through Stimulated Annihilation Radiation (GRASAR)
[NASA-TM-83857] N82-20111

COMPUTATION
Mathematical and graphical tools for the creation of computational arrays N82-19464
A computational study of the modification of raindrop size distributions in subcloud downdrafts N82-19748
Maximum wind speeds in the North Pacific (with special reference to OWS P, N and V)
[BLL-TRANS-1495-(9022.552)] N82-19749
Overview of the CHiP computer
[AD-A109293] N82-19853
On the power of probabilistic choice in synchronous parallel computations
[AD-A109047] N82-19865
Computationally fast algorithms for ARMA spectral estimation N82-19871

COMPUTATIONAL FLUID DYNAMICS
La Recherche Aerospatiale, Bimonthly Bulletin number 1981-3, May - June 1981 --- aerospace research and development
[ESA-TT-714] N82-19152
Rolling up of vortex sheets from the edges of lifting surfaces N82-19153
Strong matching method for computing transonic viscous flows including wakes and separations: Lifting airfoils N82-19155
Numerical study of incompressible slightly viscous flow past blunt bodies and airfoils N82-19163
Inverse transonic airfoil design methods including boundary layer and viscous interaction effects
[NASA-CR-168579] N82-19168
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-168610] N82-19236
Conservative supra-characteristics method for splitting the hyperbolic systems of gasdynamics for real and perfect gases
[NASA-CR-166307] N82-19904
La Recherche Aerospatiale, Bi-monthly Bulletin number 1981-4, July - August 1981 --- aerospace R and D
[ESA-TT-722] N82-20131

COMPUTER COMPONENTS
A remote terminal emulator for prime computers
[AD-A108818] N82-19862

COMPUTER DESIGN
Overview of the CHiP computer
[AD-A109293] N82-19853
Study and experimentation of horizontal microprocessor machine description techniques
[AD-A109136] N82-19860

COMPUTER GRAPHICS
The SACLANTCEN oceanographic data base. Volume 2: Access, interrogation and display
[AD-A109417] N82-19803
Syntactic visual image generation system feasibility study
[AD-A109334] N82-19858
A two-dimensional core graphics system for research in human-computer interfaces
[AD-A109280] N82-19861
Comparison of some irregular methods for level plotting interpolation
[FOA-C-20433-D8] N82-19887
NASA Facts: Images of Saturn from Voyager 2
[NASA-NF-132/10-81] N82-20102

COMPUTER INFORMATION SECURITY
Trusted computer systems. Glossary
[AD-A108829] N82-19856
Best Available Technologies (BATs) for computer security
[AD-A109189] N82-19857
SASS hardware architecture and development monitor
[AD-A109552] N82-20015
The Naval postgraduate school SECURE ARCHIVAL STORAGE SYSTEM. Part 2: Segment and process management implementation
[AD-A109553] N82-20016

COMPUTER NETWORKS
A remote terminal emulator for prime computers
[AD-A108818] N82-19862
Initial experience with a local network: Net/One by Ungermann-Bass, Incorporated
[AD-A108817] N82-19863
Performance of distributed and decentralized control models for fully distributed processing systems. Initial simulation studies
[AD-A108974] N82-19864
Synthesis of communicating processes from temporal logic specifications
[AD-A109853] N82-19866

COMPUTER PROGRAM INTEGRITY
Trusted computer systems. Glossary
[AD-A108829] N82-19856

COMPUTER PROGRAMMING
Best Available Technologies (BATs) for computer security
[AD-A109189] N82-19857
Practical issues in having a usable library of software specifications
[AD-A108656] N82-19877

The Software Acquisition Resource Expenditure (SARE) methodology, data requirements and data utilization
[AD-A109372] N82-19879
Course-of-values recursion on lists in intuitionist type theory
[CTH-MATH-1981-19] N82-19939

COMPUTER PROGRAMS
A computer program for wing subsonic aerodynamic performance estimates including attainable thrust and vortex lift effects
[NASA-CR-3515] N82-19151
Application of an airfoil stall flutter computer prediction program to a three-dimensional wing: Prediction versus experiment
[NASA-CR-168586] N82-19169
Computation of transonic potential flow about 3 dimensional inlets, ducts, and bodies
[NASA-CR-3514] N82-19179
Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-168610] N82-19236
On the design of missile models for static force measurements in wind tunnels --- aided by computer programming
[DFVLR-MITT-81-21] N82-19297
Investigations of flowfields found in typical combustor geometries
[NASA-CR-168585] N82-19495
BASIS-CRACK: An evaluation of performance --- finite element computer program verification
[FFA-TN-HU-2171] N82-19590
A computer program for cycle-by-cycle crack growth computation
[FFA-TN-HU-2048] N82-19598
The control of the quality of surface meteorological information
[BLL-TRANS-1503-(9022.552)] N82-19759
Programmable printing terminal
[INPE-2082-TDL/056] N82-19850
Analysis of the illumination of areas covered by a satellite in a heliosynchronous circular orbit
[INPE-2208-RPE/398] N82-19872
A system for implantation of data banks in Burroughs series B7000/B6000 computers
[INPE-2299-TDL/070] N82-19876
The Software Acquisition Resource Expenditure (SARE) methodology, data requirements and data utilization
[AD-A109372] N82-19879
Arithmetic manipulation of variables and data base contents by a simple dialog oriented language with structured elements
[IKE-4-104] N82-19889
Simulation of linear multi-input/multi-output systems by piecewise continuous input functions and various options for the graphical representation of results --- in regulation analysis
[DFVLR-MITT-81-23] N82-19892
Methods of image compression without information loss
[INPE-2274-PRE/054] N82-20013
SASS hardware architecture and development monitor
[AD-A109552] N82-20015

COMPUTER STORAGE DEVICES
Methods of image compression without information loss
[INPE-2274-PRE/054] N82-20013
SASS hardware architecture and development monitor
[AD-A109552] N82-20015

COMPUTER SYSTEMS DESIGN
MICAD: An interactive computer for the design of microwave circuits
[LEOK-TR-1980-06] N82-19473
Trusted computer systems. Glossary
[AD-A108829] N82-19856
Performance of distributed and decentralized control models for fully distributed processing systems. Initial simulation studies
[AD-A108974] N82-19864
Programming processor interconnection structures
[AD-A109294] N82-19893
Development of a computer consulting system using decision rules
[INPE-2296-PRE/068] N82-19894

COMPUTER SYSTEMS PERFORMANCE
Intelligence Processor Performance Analysis (IPPA)
[AD-A108794] N82-19855
A remote terminal emulator for prime computers
[AD-A108818] N82-19862
Performance of distributed and decentralized control models for fully distributed processing systems. Initial simulation studies
[AD-A108974] N82-19864
Space telescope observatory management system preliminary test and verification plan
[NASA-CR-168587] N82-20090

COMPUTER SYSTEMS PROGRAMS
Practical issues in having a usable library of software specifications
[AD-A108656] N82-19877

COMPUTER SYSTEMS SIMULATION
Study and experimentation of horizontal microprocessor machine description techniques
[AD-A109136] N82-19860

COMPUTER TECHNIQUES
The optimal planning of computerized manufacturing systems
[PB82-110644] N82-19397
An ASCII FORTRAN subroutine for computing the electromagnetic radiation scattered by a sphere
[AD-A108772] N82-19433
Taped random spectra for reliability demonstration testing
[AD-A108803] N82-19552
The periodical management system
[PB82-116518] N82-20019

COMPUTER VISION
Rotationally symmetric operators for surface interpolation
[AD-A109032] N82-19916

COMPUTERIZED DESIGN
Computational aerodynamics at weapons systems research laboratory
[WSRL-0236-TM] N82-19176
MICAD: An interactive computer for the design of microwave circuits
[LEOK-TR-1980-06] N82-19473
PSICON: A simulation package for the design of digitally controlled systems
[RR-162] N82-19890
Good layouts for pattern recognizers
[AD-A109324] N82-19897

COMPUTERIZED SIMULATION
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-168610] N82-19236
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343
Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391
The optimal planning of computerized manufacturing systems
[PB82-110644] N82-19397
Digital audio. Recursive digital filtering for high quality audio signals
[BBC-RD-1981/10] N82-19400
Mathematical modeling and SAR simulation multifunction SAR technology efforts
[NASA-CR-167535] N82-19408
VLFACM program description and operational manual
[AD-A109003] N82-19434
Modeling beam patterns of linear antennas N82-19458
Finite-element analysis for design of classical and electronically operated machines N82-19461
Laminar flow transition: A large-eddy simulation approach
[NASA-CR-3518] N82-19499
TRANSID: A computer program for the analysis of hydraulic transients in condenser cooling circuits
[CISE-1722] N82-19512
The numerical simulation of crack growth in weld-induced residual stress fields
[AD-A109321] N82-19577
Program for nonlinear structural analysis
[AD-A108975] N82-19578
Satellite scatterometer feasibility study. Volume 2: Data extraction algorithm and error simulation for wind sensor --- Earth Resources Satellite (ERS 1)
[ESA-CR(P)-1492-VOL-2] N82-19651
A simulation study to test the prediction of 1 deg times 1 deg mean gravity anomalies using least squares collocation from the GRAVSAT mission
[AD-A108867] N82-19735
A numerical model for simulation of local circulation, applied to the coastal region of Northeastern Brazil
[INPE-2270/PRE/051] N82-19776
Distribution of personnel, vehicles, and supplies by ship: A model applied to the Brazilian Navy
[INPE-2305-TDL/073] N82-19874
PSICON: A simulation package for the design of digitally controlled systems
[RR-162] N82-19890
Simulation of linear multi-input/multi-output systems by piecewise continuous input functions and various options for the graphical representation of results --- in regulation analysis
[DFVLR-MITT-81-23] N82-19892
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Simulation using computer-piloted point excitations of vibrations induced on a structure by an acoustic environment N82-20135

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A system for implantation of data banks in Burroughs series B7000/B6000 computers
[INPE-2299-TDL/070] N82-19876

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Computer models for conducting surfaces
[AD-A108763] N82-19436
Instruments and methods for studying atmospheric electricity
[BLL-TRANS-1487-(9022.552)] N82-19753

CONFERENCES
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172
Recent advances in space structure design-verification techniques --- conference proceedings
[ESA-SP-1036] N82-19308
AgRISTARS: Foreign commodity production forecasting. Minutes of the annual formal project manager's review, including preliminary technical review reports of FY80 experiments --- wheat/barley and corn/soybean experiments
[E82-10039] N82-19614
In Situ Mining Research. Proceedings of Bureau of Mines Technology Seminar
[PB82-104753] N82-19663
Climate Analysis Center Users Conference
[PB82-113325] N82-19793
Human Factors in System Development: Experiences and Trends --- conference proceedings
[FOA-A-56003-H9] N82-19839

Plasma Astrophysics --- conference proceedings, Varenna, Italy, 27 Aug. - 7 Sep. 1981
[ESA-SP-161] N82-20030

CONFIGURATION INTERACTION
An investigation into wing-canard interaction for a model with forward swept wings --- wind tunnel measurement
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CONGRESSIONAL REPORTS
Aircraft collision avoidance systems
[GPO-79-431] N82-19201
Air traffic control en route computer system
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Future space programs, 1981
[GPO-86-913] N82-19234
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Consumer behavior towards fuel efficient vehicles. Volume 1: Executive summary
[PB82-103300] N82-20027

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[DFVLR-MITT-81-22] N82-19926

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Proceedings of the 3rd Meeting of the Coordinating Group on Modern Control Theory, part 1
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A multivariable feedback control problem with application to strip base control for Sendzimir mills
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The receding horizon principle for distributed systems --- control
[RR-167] N82-19899
Variable structure systems and system zeros
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CONTROLLABILITY
An approach for gross design of operations management systems
[ISBN-951-752-308-4] N82-20007

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Six degree of freedom manual controls study report
[NASA-CR-167532] N82-19837
Asymptotic properties of unknown systems --- and controller design problems
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CONVECTION CLOUDS
Thermodynamic features affecting convective cloud growth and dynamic seeding: A comparative summary of HIPLEX soundings, 1975 to 1977
[PB82-123423] N82-19791

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The development and testing of methods to infer midlatitude precipitation intensity from geosynchronous satellite infrared data
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Mixed convection in molten metals
[BLL-RISLEY-TR-4385-(9091.9F)] N82-19355

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Convergence zones in the South Atlantic and their influence on the precipitation regime in Northeastern Brazil
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CORONAL HOLES
Solar-geophysical data number 443. Part 1: (Prompt reports). Data for June 1981, May 1981
[PB82-113853] N82-20107

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Comparative studies of correlation techniques in the sidelobe canceller in the presence of pulse-type jamming signals --- for electronic countermeasures
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[NASA-TM-84029] N82-20089

COSMOLOGY
Plasma Astrophysics --- conference proceedings, Varenna, Italy, 27 Aug. - 7 Sep. 1981
[ESA-SP-161] N82-20030
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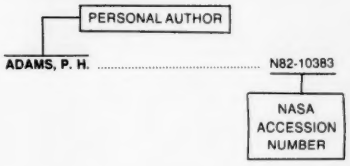

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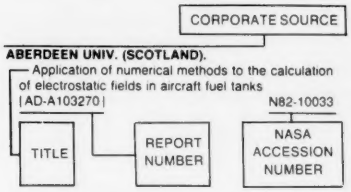

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Ergonomic considerations in product design and evaluation N82-19842

ALABAMA UNIV. IN HUNTSVILLE.
Target/clutter discrimination techniques for laser semi-active missile systems N82-19253
Analysis and synthesis of binary sequences N82-19463
Dynamics of a chain of flexible bodies N82-19553
Optimal rendezvous between close circular orbits N82-19900

ALASKA UNIV., FAIRBANKS.
Kinetic response of ionospheric ions to onset of auroral electric fields
[NASA-CR-164799] N82-19727
ANALYTICAL AND COMPUTATIONAL MATHEMATICS, ZURICH (SWITZERLAND).
Study on the extension of the stroboscopic method to the second order
[ESA-CR(P)-1488] N82-19886
ARIZONA STATE UNIV., TEMPE.
Socioeconomic impact of photovoltaic power at Schuchuli, Arizona
[NASA-CR-165551] N82-19669
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
An ASCII FORTRAN subroutine for computing the electromagnetic radiation scattered by a sphere
[AD-A108772] N82-19433
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Thermo-elastic-plastic stresses in multilayered cylinders
[AD-A109320] N82-19579
ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Helicopter Icing Spray System (HISS) nozzle improvement evaluation
[AD-A109405] N82-19208
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
Spanwise loading distribution and wake velocity surveys of a semi-span wing
[NASA-TM-84213] N82-19164
ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
Synoptic meteorology during the SNOW-ONE field experiment
[AD-A109080] N82-19784
ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT MONMOUTH, N. J.
Radiation and temperature tests of cadmium telluride detectors
[AD-A108774] N82-19522
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Abrasion-erosion resistance of fiber reinforced concrete
[AD-A108988] N82-19394
Precast concrete pavements
[AD-A108802] N82-19395
Analysis of methodologies used for the assessment of wetlands values: Appendices C-E
[PB82-110362] N82-19807
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Stress intensity and fatigue crack growth in multiply-cracked, pressurized, partially autofrettaged thick cylinders
[AD-A109081] N82-19580
ARMY MATERIEL SYSTEMS ANALYSIS ACTIVITY, ABERDEEN PROVING GROUND, MD.
Proceedings of the 3rd Meeting of the Coordinating Group on Modern Control Theory, part 1
[AD-A109124] N82-19896
ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
A survey of atmospheric turbulence characteristics
[AD-A109306] N82-19738
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
The effect of surface coatings on the fatigue strength of aluminum alloys
[AD-A108869] N82-19363
Performance of industrial-type engines in military equipment using synthetic crankcase oils
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ARO, INC., ARNOLD AIR FORCE STATION, TENN.
Hypervelocity track tests of the NASA Galileo probe heatshield
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ATMOSPHERIC RADIATION CONSULTANTS, ACTON, MASS.
Inversion of spire NO data
[AD-A108866] N82-19736
ATMOSPHERIC SCIENCES LAB., WHITE SANDS MISSILE RANGE, N. MEX.
Backscatter and extinction in water clouds
[AD-A109277] N82-19975

B

BALL STATE UNIV., MUNCIE, IND.
Determination of the effects of material from alternate energy sources on the upper respiratory tract clearance mechanism. Part 1: In vitro exposure to particulate pollutants. Part 2: In vivo exposure to ozone
[PB82-117037] N82-19811
BARNES ENGINEERING CO., STAMFORD, CONN.
Electro-optical system for remote position measurements in real time N82-19272
BATTELLE COLUMBUS LABS., OHIO.
The development of a dynamic elastoplastic finite element analysis for fast fracture under impact loading
[AD-A109323] N82-19575
Finite element analysis of dynamic crack propagation
[AD-A109322] N82-19576
The numerical simulation of crack growth in weld-induced residual stress fields
[AD-A109321] N82-19577
Numerical deconvolution to obtain cloud signatures from scattered light pulses
[AD-A108806] N82-19783
BAYLOR UNIV., HOUSTON, TEX.
Evaluation of materials proposed for use in space flight
[NASA-CR-167537] N82-19815
BOEING AEROSPACE CO., KENT, WASH.
A study of flight control requirements for advanced, winged, earth-to-orbit vehicles with far-aft center-of-gravity locations
[NASA-CR-3491] N82-19226
BOEING AEROSPACE CO., SEATTLE, WASH.
Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft N82-19277
Configuration development of the Land Mobile Satellite System (LMSS) Spacecraft: Conclusions N82-19278
Program for nonlinear structural analysis
[AD-A108975] N82-19578
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BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Electric flight systems N82-19144
Transonic pressure measurements and comparison of theory to experiment for three arrow-wing configurations
[NASA-CR-3434] N82-19177
Computation of transonic potential flow about 3 dimensional inlets, ducts, and bodies
[NASA-CR-3514] N82-19179
BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Transonic perturbation analysis of wing-fuselage-nacelle-pylon configurations with powered jet exhausts
[NASA-CR-165852] N82-19167
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
SATNET development and operation. Pluribus satellite IMP development. Remote site maintenance. Internet operations and maintenance. Mobile access terminal network. TCP for the HP3000. TCP-TAC. TCP for VAX-UNIX. Combined quarterly technical report
[AD-A108783] N82-19432
BOOZ-ALLEN AND HAMILTON, INC., NEW YORK.
Cost data base development: A twelve-year perspective
[AD-A109371] N82-20014
BOSCH (ROBERT) G.M.B.H., BERLIN (WEST GERMANY).
Spectrum saving speech transmission for land mobile radio. A study on single sideband transmission in 5 kHz channels for 2 and 4 m bandwidths
[BMFT-FB-T-81-173] N82-19442
BRISTOL UNIV. (ENGLAND).
An investigation into wing-canard interaction for a model with forward swept wings
[BU-261] N82-19191
The unsteady aerodynamics of certain bluff shapes
[BU-264] N82-19192
A study of the effects of leading-edge slats on the performance of slender wings
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[BU-268] N82-19194
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The pressure signature method for blockage corrections, and its applications to the industrial wind tunnel
[BU-263] N82-19231
Shear diffusion in sandwich specimens having glass reinforced plastic face plates with paper honeycomb cores
[BU-270] N82-19327
The structural behaviour of inflated cylindrical cantilever beams
[BU-260] N82-19597
BRITISH AEROSPACE DYNAMICS GROUP, BRISTOL (ENGLAND).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2B] N82-19294
EXUV. Phase A report. Volume 3: Preliminary payload interface specification
[REPT-44/69/JS/CB-VOL-3] N82-19295
EXUV. Phase A study. Volume 4: Satellite development program
[REPT-44/69/JS/CB-VOL-4] N82-19296
Giotto Comet Halley mission, phase A study. Volume 1: Spacecraft design
[ESS/SS/1000] N82-19313
Life-size quantitative tests on a simple counterspun flywheel nutation damper
[BAE-NUTDAM-11] N82-19541
BRITISH AEROSPACE DYNAMICS GROUP, STEVENAGE (ENGLAND).
Study of Earth Resources Satellite (ERS) data reduction unit
[BAE-TP-7905] N82-19649
BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
Improvements to speech quality from a diving helmet
[BBC-RD-1981/9] N82-19399
Digital audio. Recursive digital filtering for high quality audio signals
[BBC-RD-1981/10] N82-19400
BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Mixed convection in molten metals
[BLL-RISLEY-TR-4385-(9091.9F)] N82-19355
Stratospheric ozone concentration measurements at sunrise and at sunset
[BLL-TRANS-1499-(9022.552)] N82-19720
Geophysical effects on the length of the sideral day
[BLL-TRANS-1489-(9022.552)] N82-19721
Maximum wind speeds in the North Pacific (with special reference to OWS P, N and V)
[BLL-TRANS-1495-(9022.552)] N82-19749
Area precipitation measurement by weather radar: Problems and practical experiences
[BLL-TRANS-1458-(9022.552)] N82-19750
The computation of the ground surface temperature for simulation of the general atmospheric circulation
[BLL-TRANS-1521-(9022.552)] N82-19751
Regional classification of the spectral variance of long European temperature series and its application in a statistical filter model for forecasting in the region north of the alps
[BLL-TRANS-1514-(9022.552)] N82-19752
Instruments and methods for studying atmospheric electricity
[BLL-TRANS-1487-(9022.552)] N82-19753
Statistical study of freezing clouds in the GINA 2-PAP, March - April 1979
[BLL-TRANS-1511-(9022.552)] N82-19754

The applicability of pressure measurements by radiosondes to calculating the height
[BLL-TRANS-1505-(9022.552)] N82-19755
Classification of the fields of anomaly in monthly water temperature of the North Atlantic during the cold half-year
[BLL-TRANS-1509-(9022.552)] N82-19756
Methodology for the use of (foreign) synoptic messages in the generalization of climatological information (derivation of climatic parameters)
[BLL-TRANS-1506-(9022.552)] N82-19757
A new meteorological code for 1 January 1982
[BLL-TRANS-1510-(9022.552)] N82-19758
The control of the quality of surface meteorological information
[BLL-TRANS-1503-(9022.552)] N82-19759
Cost estimates in connection with the selection of a system for long-term storage of hydrometeorological data
[BLL-TRANS-1502-(9022.552)] N82-19760
Some characteristics of the variation of air temperature in the northern hemisphere during individual months of the period 1881-1975
[BLL-TRANS-1497-(9022.552)] N82-19761
Turbulence within cumulus clouds and outside them
[BLL-TRANS-1481-(9022.552)] N82-19762
The use of weather radar in the civil aviation weather service
[BLL-TRANS-1456-(9022.552)] N82-19763
Inversion layers and their interaction with cumulus clouds below
[BLL-TRANS-1482-(9022.549)] N82-19764
Automatic measurement of areal precipitation using C-band radar
[BLL-TRANS-1378-(9022.552)] N82-19765
The problem of precipitation measurement by attenuation of radio waves
[BLL-TRANS-1475-(9022.549)] N82-19766

BRITISH PLASTICS FEDERATION, LONDON (ENGLAND).
The weathering of plastics materials in the tropics. 6: The further evaluation of a solar radiation concentrating device (EMMA) as a means of accelerating the weathering of plastics
[AD-A109385] N82-19376

BROWN UNIV., PROVIDENCE, R. I.
Electromagnetic deep-probing (100-1000 KMS) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E82-10043] N82-19618
Electromagnetic deep-probing (100-1000 KMS) of the Earth's interior from artificial satellites: Constraints on the regional emplacement of crustal resources
[E82-10044] N82-19619

BUNDESANSTALT FUER GEOWISSENSCHAFTEN UND ROHSTOFFE, HANNOVER (WEST GERMANY).
Deuterium hydrogen isotope ratios in organic matter, mineral oils, and natural gases
[BMFT-FB-T-81-204] N82-19319

BUNDESMINISTERIUM FUER FORSCHUNG UND TECHNOLOGIE, BONN (WEST GERMANY).
Digital time control for camera shutters
[PB82-116328] N82-19529

BUREAU OF MINES, TWIN CITIES, MINN.
In Situ Mining Research. Proceedings of Bureau of Mines Technology Seminar
[PB82-104753] N82-19663

BUREAU OF RECLAMATION, BOULDER CITY, NEV.
Water assessment for the Lower Colorado River region-emerging energy technology development
[PB82-110107] N82-19398

BUREAU OF RECLAMATION, DENVER, COLO.
Thermodynamic features affecting convective cloud growth and dynamic seeding: A comparative summary of HIPLEX soundings, 1975 to 1977
[PB82-123423] N82-19791

BUSINESS AND TECHNOLOGICAL SYSTEMS, INC., SEABROOK, MD.
Equivalent source modeling of the main field using Magsat data
[E82-10041] N82-19616
Magsat science investigations
[E82-10045] N82-19620
An information adaptive system study report and development plan
[NASA-CR-166768] N82-19644

C

CAE ELECTRONICS LTD., MONTREAL (QUEBEC).
Six degree of freedom manual controls study report
[NASA-CR-167532] N82-19837

CALIFORNIA INST. OF TECH., PASADENA.
Extragalactic radio sources N82-20051

CALIFORNIA STATE UNIV., SAN DIEGO.
The new paradigm in cosmic plasma physics N82-20031
The Voyager 1 Saturn encounter and the cosmogonic shadow effect N82-20032

CALIFORNIA UNIV., BERKELEY.
Numerical study of incompressible slightly viscous flow past blunt bodies and airfoils N82-19163
Effect of nuclear spin on chemical reactions and internal molecular rotation N82-19330
One and two dimensional photochemical modeling of the two chemical interactions in the middle atmosphere (0-120 km) N82-19719
Pulsar theory: Particle acceleration and photon emission in the polar flux tube N82-20056

CAMBRIDGE UNIV. (ENGLAND).
Production and propagation of jets N82-20055
Hot plasmas in active galactic nuclei N82-20058
Ion pressure-supported accretion tori and the origin of radio jets. A plea for specific advice on the plasma physics N82-20067

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).
New bioreactors for aerobic processes
[ISSN-0077-5606] N82-19679
Study of the kinetics of oxygen saturation of fluorocarbon emulsions
[ISSN-0077-5606] N82-19810

CANYON RESEARCH GROUP, INC., WESTLAKE VILLAGE, CALIF.
Descent-rate cuing for carrier landings: Effects of display gain, display noise and aircraft type
[AD-A108801] N82-19206

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Integrated devices of semiconductor metal-oxides in conjunction with silicon for solid-state gas sensors
[DE82-000397] N82-19477
Metaphor: An inescapable phenomenon in natural language comprehension
[AD-A109026] N82-19880
An MDI model and an algorithm for composite hypotheses testing and estimation in marketing
[AD-A109147] N82-20009

CENTER FOR ASTROPHYSICS, CAMBRIDGE, MASS.
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

CENTRE D'ETUDE SPATIALE DES RAYONNEMENTS, TOULOUSE (FRANCE).
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

CENTRE DE RECHERCHES EN PHYSIQUE DE L'ENVIRONNEMENT TERRESTRE ET PLANETAIRE, ORLEANS (FRANCE).
Fast processor for spectral analysis (ORAS)
[CRPE-NT-106] N82-19870

CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
Study of a COMSS high accuracy positioning system: High Accuracy Positioning System (HASP)
[CNES-85.55.00] N82-19307
Methodology of uniaxial transient vibration tests for satellites N82-19311

CENTRO INFORMAZIONI STUDI ESPERIENZE, MILAN (ITALY).
Corrosion of carbon steel at high temperature in reducing chemical conditions
[CISE-1699] N82-19368
High stability coplanar oscillators
[CISE-1720] N82-19485
TRANSID: A computer program for the analysis of hydraulic transients in condenser cooling circuits
[CISE-1722] N82-19512

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
Spinor genera of orders and quadratic forms
[CTH-MATH-1981-20] N82-19922
Applications of a general comparison theory for convolution integrals
[CTH-MATH-1981-21] N82-19923

Course-of-values recursion on lists in intuitionist type theory
[CTH-MATH-1981-19] N82-19939

CHICAGO UNIV., ILL.
The magnetohydrodynamic dynamo N82-20033
The nonequilibrium of magnetic fields N82-20034

CITY COLL. OF THE CITY UNIV. OF NEW YORK.
Monte Carlo studies of ocean wind vector measurements by SCATT: Objective criteria and maximum likelihood estimates for removal of aliases, and effects of cell size on accuracy of vector winds
[NASA-CR-165837-1] N82-19799

COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.
Products from two computer programs which process digital bathymetric data
[AD-A108757] N82-19881

COLOGNE UNIV. (WEST GERMANY).
Atlas of the global distribution of the total ozone concentration according to satellite measurements
[MITT-28] N82-19740

COLORADO STATE UNIV., FORT COLLINS.
Light scattering from macromolecular systems: Molecular crystals and polymers
[AD-A109086] N82-19973

COLORADO UNIV., BOULDER.
Pulsar magnetosphere potential structure N82-20066
Confinement of cosmic rays in molecular clouds N82-20073
Large loop thermal models of solar hard X-ray bursts N82-20080

COLORADO UNIV. AT BOULDER.
A measurement of long term tilt in Colorado and Wyoming
[AD-A108865] N82-19737

COMMERCE DEPT., WASHINGTON, D.C.
US energy for the rest of the century
[PB82-115866] N82-19697
Technology assessment and forecast report, 10th
[REPT-10] N82-20024

COMMISSARIAT A L'ENERGIE ATOMIQUE, SACLAY (FRANCE).
Stability of the equilibrium states of the interstellar gas and field system N82-20037
High energy cosmic ray acceleration by diffusive shocks N82-20061
Cosmic ray acceleration by stellar winds and self-confinement in giant H2 regions N82-20062

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
Space Shuttle operations
[GPO-89-661] N82-19300

COMMITTEE ON FOREIGN AFFAIRS (U. S. HOUSE).
United States-Canadian relations and acid rain
[GPO-80-995] N82-19706

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Aircraft collision avoidance systems
[GPO-79-431] N82-19201
Air traffic control en route computer system
[GPO-89-008] N82-19202
Future space programs, 1981
[GPO-86-913] N82-19234

COMMUNICATIONS RESEARCH CENTRE, OTTAWA (ONTARIO).
ANIK-B program delivery pilot project. A 12 month performance assessment
[CRC-1349] N82-19426
A method of measuring and recording. The impulse response of the ionospheric channel
[CRC-1352] N82-19427
A microwave FET oscillator design approach and its application in an injection locked oscillator
[CRC-1347] N82-19472
Review of health and safety aspects of video display terminals
[CRC-TN-712-E] N82-19816

COMPUTER SCIENCES CORP., SILVER SPRING, MD.
Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
[NASA-TM-82164] N82-19779

CONNECTICUT UNIV., STORRS.
Interaction of microsegregation and coarsening during dendritic nickel-base alloy monocrystal growth
[AD-A108980] N82-19362

CONSIGLIO NAZIONALE DELLE RICERCHE, TURIN (ITALY).
Large scale Kelvin-Helmholtz instabilities in extragalactic radio jets N82-20070
CONSIGLIO NAZIONALE DELLE RICERCHE, VENICE (ITALY).
LANDSAT imagery of the Venetian Lagoon: A multitemporal analysis
[E82-10036] N82-19612
COPENHAGEN UNIV. (DENMARK).
Cardiovascular reactions to tilt and lower body positive pressure (LBPP) N82-19825
Measurements of intra and extracellular water spaces and electrolyte concentrations in human skeletal muscle N82-19829
A comparison between acetylene and freon rebreathing for measuring cardiac output during exercise N82-19831
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Solute-gas equilibria in multi-organic aqueous systems
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Report on the analysis of data from the NOAA/Alaskan MST radar system
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[AD-A108870] N82-19995
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DANISH METEOROLOGICAL INST., COPENHAGEN.
Diffuse and discrete optical emissions at the poleward border of the morning auroral oval
[DMI-GEOPHIS-PAPERS-R-66] N82-19742
DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Algorithms for tracking a sound source using frequency and bearings
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Detection range probabilities of passive infrared systems for the North Atlantic
[AD-A108812] N82-19974
DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Magnetic properties of copper alloys
[DRIC-T-6498] N82-19356
Maintenance of hydrostatic transmissions
[DRIC-T-6497] N82-19490
Pellini's theory of brittle fracture and the limits of its applicability
[DRIC-T-6468] N82-19585
DELAWARE UNIV., NEWARK.
Detrital exchange processes of a Delaware salt marsh N82-19699
Practical issues in having a usable library of software specifications
[AD-A108656] N82-19877
Prerequisites to deriving formal specifications from natural language requirements
[AD-A108612] N82-19878
DELFT HYDRAULICS LAB. (NETHERLANDS).
On the Neumann problem for the pressure in a Navier-Stokes model
[PUBL-257] N82-19511
DEPARTMENT OF AGRICULTURE, HOUSTON, TEX.
AgRISTARS: Soil moisture/early warning and crop condition assessment. Interface control document
[E82-10053] N82-19628
AgRISTARS: Yield model development/soil moisture. Interface control document
[E82-10054] N82-19629
Taxonomic classification of world map units in crop producing areas of Argentina and Brazil with representative US soil series and major land resource areas in which they occur
[E82-10058] N82-19633
DEPARTMENT OF ENERGY, LONDON (ENGLAND).
Review of the UK transport energy outlook: And policy recommendations
[EP-47] N82-19664
Energy conservation in the production of domestic hot water
[EP-48] N82-19665
Tidal power from the Severn estuary, volume 1
[EP-46-VOL-1] N82-19666
Tidal power from the Severn estuary. Volume 2: Analysis, studies, reports and evaluations
[EP-46-VOL-2] N82-19667
DEPARTMENT OF TRADE AND INDUSTRY, LONDON (ENGLAND).
Report of the Air Traffic Forecasting Working Party, 1981 N82-19195
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Electronics for data acquisition of laser gyroscope measurements
[DFVLR-MITT-81-16] N82-19534
Interactions between helmet mounted sight display and sensor platform under the influence of a human pilot
[DFVLR-FB-81-30] N82-19848
Noise measurements on the helicopter BK 117 design. Weighted noise levels and influence of airspeed
[DFVLR-MITT-81-18] N82-19957
Collection and evaluation of propeller aircraft noise certification data
[DFVLR-MITT-81-20] N82-19958
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
On the design of missile models for static force measurements in wind tunnels
[DFVLR-MITT-81-21] N82-19297
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
An investigation of wall pressure fluctuations behind a sudden enlargement of the cross sectional area of a round pipe
[DFVLR-FB-81-35] N82-19510
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Planning of a C-band pulse Doppler radar with polarization diversity for atmospheric research in the mesoscale range
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Simulation of linear multi-input/multi-output systems by piecewise continuous input functions and various options for the graphical representation of results
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[BMVG-FBWT-81-12] N82-19983
DEUTSCHES GEODAETISCHES FORSCHUNGSINSTITUT, MUNICH (WEST GERMANY).
Helmut Wolf: On the occasion of his 70th birthday
[SER-E-18] N82-19603
Developments in geodesy within the scope of Helmut Wolf's work N82-19604
Mathematical and stochastic models in photogrammetry relating to Helmut Wolf's work N82-19605
The diagnosis settlement 1980 of the German main triangulation network. Part 2: Trajectories
[SER-B-253-MITT-159-PT-2] N82-19648
DONOHUE AND ASSOCIATES, INC., SHEBOYGAN, WIS.
Small scale reclamation/disposal of toxic porcelain enameling waste sludges
[PB82-101593] N82-19710
DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2B] N82-19294
EXUV. Phase A report. Volume 3: Preliminary payload interface specification
[REPT-44/69/JS/CB-VOL-3] N82-19295
EXUV. Phase A study. Volume 4: Satellite development program
[REPT-44/69/JS/CB-VOL-4] N82-19296
Giotto Comet Hailey mission, phase A study. Volume 1: Spacecraft design
[ESS/SS/1000] N82-19313
Improvement of the X-ray procedure for the detection of defective adhesions in fiber composites by adding contrast substances to the adhesives
[BMVG-FBWT-81-11] N82-19324
Satellite scatterometer feasibility study. Volume 1: Technical results
[ESA-CR(P)-1492-VOL-1] N82-19650
Satellite scatterometer feasibility study. Volume 2: Data extraction algorithm and error simulation for wind sensor
[ESA-CR(P)-1492-VOL-2] N82-19651
Study of a radar altimeter for the European remote sensing program. Volume 1: Executive summary
[SPAR-R.1090-ISSUE-A] N82-19652
Development of simple solar collectors
[BMFT-FB-T-81-174] N82-19690
DORTMUND UNIV. (WEST GERMANY).
A solar high temperature kiln
[BMFT-FB-T-81-181] N82-19692
DUFRESNE-HENRY, INC., NORTH SPRINGFIELD, VT.
An inexpensive biologic method of upgrading Lagoon effluent, phase 1: Small business innovative research program
[PB82-101072] N82-19713

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ECOLE NATIONALE SUPERIEURE DES MINES, VALBONNE (FRANCE).
The TOCIND experiment
[CTAMN/81/R/10] N82-19805
ECOLE POLYTECHNIQUE, PALAISEAU (FRANCE).
On the possibility of existence of large amplitude waves around pulsars N82-20059
The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio
[NASA-TM-83891] N82-20103
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (SWITZERLAND).
Activities report of the Hydraulics Laboratory N82-19489
Double layer and potential jump: A review of laboratory experimental evidence N82-20078
ELECTRONIC TECHNIQUES, INC., FORT COLLINS, COLO.
SCPP forecasting support
[PB82-123167] N82-19797
ELECTRONICS RESEARCH LAB., ADELAIDE (AUSTRALIA).
An aerial survey of water turbidity and laser depth sounding performance along the Queensland Coast
[AD-A109050] N82-19802
EMORY UNIV., ATLANTA, GA.
The effects of sulfur dioxide and acid precipitation on decomposition and nutrient cycling processes N82-19700
ENGINEERING DYNAMICS INTERNATIONAL, ST. LOUIS, MO.
Airport related residential accoustical insulation demonstration project: Report 1720
[PB82-100777] N82-19396
ENGINS MATRA, VELIZY (FRANCE).
EXUV. Phase A study. Volume 1: Executive summary
[REPT-44/69/JS/CB-VOL-1] N82-19292
EXUV. Phase A study. Volume 2A: Satellite system conceptual design
[REPT-44/69/JS/CB-VOL-2A] N82-19293
EXUV. Phase A study. Volume 2B: Satellite system conceptual design
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Data rate reduction. Impact of image data compression on end to end data management of a multispectral payload
[REPT-44/130] N82-19654

Optical imaging instruments for the Land Application Satellite System. Phase A study. Volume 1
[REPT-60/1023-VOL-1] N82-19979
Optical imaging instruments for the Land Application Satellite System, phase A study, volume 2
[REPT-60/1023-VOL-2] N82-19980

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
SAR calibration technology review
[NASA-CR-167534] N82-19407
Notes for Brazil sampling frame evaluation trip
[E82-10060] N82-19635

ERGONOMAAD A.B., KARLSTAD (SWEDEN).
Human factors and safety in nuclear power plant operation N82-19843

EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Equipment for testing and measuring a 'helmet mounted sight and display' system with a coupled movable TV camera in the flight simulator for research of the DFVLR
[ESA-TT-675] N82-19219
Space activities in the 80's: The programs and the industry. Parts 1 and 2: Survey of space programs (1975 to 1980); survey of the capabilities and experience of the European space industry
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Space activities in the 80's: The programs and the industry. Part 3: Detailed presentation of the European space industry (1981)
[ESA-SP-1012-VOL-2] N82-19244
Space activities in the 80's: The programs and the industry. Part 4: Outlook of space industry outside Europe (1981)
[ESA-SP-1012-VOL-3] N82-19245
Recommendations on the development of space science in the 1980's
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Modeling of the influence of static acceleration on surface wave (quartz) oscillator
[ESA-TT-726] N82-19444
Human cardiovascular adaptation to zero gravity
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Catalogue of ESA publications in 1980
[ESA-SP-1037] N82-20017
The economic impact of an operational European meteorological satellite program in the 1980's
[ESA-BR-03] N82-20020
Plasma Astrophysics
[ESA-SP-161] N82-20030

EUROPEAN SPACE RESEARCH AND TECHNOLOGY CENTER, NOORDWIJK (NETHERLANDS).
Introduction to problems of structural dynamics verification N82-19309
Plasma processes at collisionless shock waves N82-20047
The International Solar Polar Mission (ISPM) N82-20048

EUROSAT S.A., GENEVA (SWITZERLAND).
Teleoperation and automation: A survey of European expertise applicable to docking and assembly in space
[MP/PR/4905] N82-19240
The economic impact of an operational European meteorological satellite program in the 1980's
[ESA-BR-03] N82-20020

EUROSPACE, PARIS (FRANCE).
Television services in Europe in the age of direct satellite television
[ESA-CR(P)-1503] N82-19439

F

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Analysis of a nonlinear altitude tracking method
[AD-A108878] N82-19197
Transport aircraft cockpit standardization (Federal Aviation regulations part 25)
[AD-A108924] N82-19207
Workshop on Mathematical Fire Modeling
[AD-A108876] N82-19343

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
FAA statistical handbook of aviation
[AD-A109289] N82-19198

FERRANTI LTD., BRACKNELL (ENGLAND).
Analogue SAR signal processing: Device evaluation and radiation tests
[REPT-3972-ISSUE-1] N82-19440

FIAT RESEARCH CENTER, TURIN (ITALY).
Follow on study on Fluid Physics Module (PM). Part 1: Independent operating Fluid Physics Module (FPM)
[REPT-79-RV-0] N82-19241

FLORIDA STATE UNIV., TALLAHASSEE.
The twenty year average atmospheric structure at Lima, Peru
[PB82-114216] N82-19795
Coastal upwelling ecosystems analysis. Atlas of the JOINT I aircraft winds for the 500 foot level
[PB82-114703] N82-19796

FLORIDA UNIV., GAINESVILLE.
The polarized infrared reflection spectroscopic characterization and aqueous durability of lithia-disilicate glass ceramics N82-19369
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Use of thermal inertia determined by HCMM to predict nocturnal cold prone areas in Florida
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Electrotransport in thin films
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FONDAZIONE UGO BORDONI, ROME (ITALY).
The generation of pseudorandom binary sequences in parallel
[FUB-9-1981] N82-19486

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME (ITALY).
Precipitation assessment from environmental satellite data for northwest Libya including the Gefara plan
[RSC-4] N82-19790

FORD AEROSPACE AND COMMUNICATIONS CORP., HOUSTON, TEX.
Mission support plan STS-2
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FORSCHUNGSINSTITUT FUER HOCHFREQUENZPHYSIK, WERTHHOVEN (WEST GERMANY).
Comparative studies of correlation techniques in the sidelobe canceller in the presence of pulse-type jamming signals
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Measurements of azimuth and distance using arbitrary configurations of sensors with unknown coordinates in two dimensions
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FRANKLIN ASSOCIATES, PRAIRIE VILLAGE, KANS.
Impediments to energy and materials recovery facilities for municipal solid waste
[PB82-102302] N82-19383

FRANKLIN RESEARCH CENTER, PHILADELPHIA, PA.
Literature study of the biodegradability of chemicals in water. Volume 1: Biodegradability prediction, advances in chemical interferences with wastewater treatment
[PB82-100843] N82-19711
Literature study of the biodegradability of chemicals in water. Volume 2: Permutated index of chemicals, microbial populations, and wastewater treatment systems with bibliography
[PB82-100850] N82-19712

FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).
Electrooptical effects for application in liquid crystal displays
[BMFT-FB-T-81-170] N82-19982
Analysis of deep defects in III-V semiconductors
[BMFT-FB-T-81-197] N82-19999

FRAUNHOFER-INST. FUER SYSTEMTECHNIK UND INNOVATIONSFORSCHUNG, KARLSRUHE (WEST GERMANY).
Examination of heat storage in soil
[BMFT-FB-T-81-200] N82-19694

FRIEDRICHSFELD G.M.B.H., MANNHEIM (WEST GERMANY).
Production technology of an oxygen ion conductive ceramic for high temperature fuel cells and high temperature water electrolysis
[BMFT-FB-T-81-180] N82-19691

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Cooled variable-area radial turbine technology program
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GENERAL ELECTRIC CO., CINCINNATI, OHIO.
A propulsion view of the all-electric airplane N82-19136

GENERAL ELECTRIC CO., FAIRFIELD, CONN.
Life sciences passive GN2 freezer thermal performance test
[NASA-CR-167546] N82-19809

GENERAL ELECTRIC CO., HOUSTON, TEX.
Analysis of evaporative water loss in the Skylab astronauts
[NASA-CR-167462] N82-19814

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GENERAL ELECTRIC CO., SANTA BARBARA, CALIF.
Planning study to establish DOD manufacturing technology information analysis center
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GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Impact response characteristics of polymeric materials
[AD-A109281] N82-19377

GEOLOGICAL SURVEY, BOSTON, MASS.
Water resources data for New Hampshire and Vermont, water year 1980
[PB82-110156] N82-19658

GEOLOGICAL SURVEY, HARRISBURG, PA.
Water resources data for Pennsylvania, water year 1980: Volume 2: Susquehanna and Potomac River Basins
[PB82-115908] N82-19662

GEOLOGICAL SURVEY, RICHMOND VA.
Water resources data for Virginia, water year 1980
[PB82-113416] N82-19659

GEORGETOWN UNIV., WASHINGTON, D.C.
Multiangular scanning absorption-emission techniques for three-dimensional combustion diagnostics
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Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
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Symmetric complementation, revision [AD-A108823] N82-19936

HELSINKI UNIV. (FINLAND).
On nuclear Koethe spaces defined by Dragilev functions [ISSN-0355-0087] N82-19960

HELSINKI UNIV. OF TECHNOLOGY, ESPOO (FINLAND).
Acta Polytechnica Scandinavica. Oxygen-metal (Ag, Au, Bi, Cu, In, Ni, Sb, Sn, Te) interactions in dilute molten lead alloys [ISBN-951-666-137-3] N82-19359
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HONEYWELL, INC., CLEARWATER, FLA.
Overview of Honeywell electromechanical actuation programs N82-19142

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Microprocessor controlled stamping unit with needle printer [BMFT-FB-T-81-189] N82-19668

HOUSTON UNIV., TEX.
Search for large-scale coherent structures in the nearly self-preserving region of a turbulent axisymmetric jet [AD-A108334] N82-19501
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HOWARD UNIV., WASHINGTON, D. C.
Characterization of low intensity X-ray imaging devices (Lixiscope) [NASA-CR-168584] N82-19972

HUGHES RESEARCH LABS., MALIBU, CALIF.
Polarization-independent optical waveguide switch [AD-A108764] N82-19976

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IBM FEDERAL SYSTEMS DIV., MANASSAS, VA.
Electrical characterization of super Schottky [AD-A108766] N82-19996

IEA COAL RESEARCH, LONDON (ENGLAND).
Chemical desulphurisation of coal [ICTIS-TR-15] N82-19332
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ILLINOIS UNIV. AT URBANA.
Initiation, combustion and transition to detonation in homogeneous and heterogeneous reactive mixtures: A summary [AD-A109057] N82-19347

ILLINOIS UNIV. AT URBANA-CHAMPAIGN.
Wave propagation problems in certain elastic anisotropic half spaces N82-19454
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ILLINOIS UNIV., URBANA.
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Electron kinetic equations in comptonization by isotropic photons N82-20065

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Improvements of the algorithms used for Monte-Carlo direct simulation computations [IC-AERO-81-03] N82-19891

INDIAN INST. OF SCIENCE, BANGALORE.
Evaluation and control of the exhaust noise of reciprocating I.C. engines N82-19559

INDIAN INST. OF TECH., NEW DELHI.
Vibration control with viscoelastic materials, 2 N82-19560

INDUSTRIEANLAGEN-BETRIEBSGESELLSCHAFT M.B.H., OTTOBRUNN (WEST GERMANY).
Dynamic analysis and modeling of electrodynamic vibration test facilities applied to the AIBG 160 kN system N82-19310
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INFORMATION SYSTEMS AND NETWORKS CORP., CHEVY CHASE, MD.
Space telescope observatory management system preliminary test and verification plan [NASA-CR-168587] N82-20090

INSTITUT D'AERONOMIE SPATIALE DE BELGIQUE, BRUSSELS.
Some aspects of the solar radiation incident at the top of the atmospheres of Mercury and Venus [AERONOMICA-ACTA-A-236-1981] N82-19722
Theory of the auroral magnetosphere [AERONOMICA-ACTA-A-237-1981] N82-19723
Solar irradiance retween 120 and 400 mm and its variations [AERONOMICA-ACTA-A-238-1981] N82-19724
A free boundary value problem arising in climate dynamics [AERONOMICA-ACTA-A-240-1981] N82-19767

INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.
Assessment of Avionic Equipment Field Reliability and Maintainability as Functions of Unit Cost [AD-A109373] N82-19218

INSTITUTE OF OCEANOGRAPHIC SCIENCES, BIRKENHEAD (ENGLAND).
Publications and reports of the Institute of Oceanographic Sciences 1973-1978 [IOS-R-122] N82-19798

INSTITUTE OF SPACE RESEARCH, MOSCOW (USSR).
Precise source location of the anomalous 1979 March 5 gamma ray transient [NASA-TM-83884] N82-20110

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
General configuration and internal disposition of equipment in a satellite for collecting environmental data [INPE-2240-PRE/026] N82-19256
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Introduction to celestial mechanics
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INSTITUUT TNO VOOR WISKUNDE, INFORMATIEVERWERKING EN STATISTIEK, THE HAGUE (NETHERLANDS).
Binary mosaics and point quadrat sampling in ecology
[A-80-ST-96-37] N82-19705

INTERIOR DEPT., WASHINGTON, D.C.
COBALT: Effectiveness of alternative US policies to reduce the costs of a supply disruption
[PB82-110560] N82-20021

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Formatting and documenting multidisciplinary data
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INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS, LAXENBURG (AUSTRIA).
Life on a warmer Earth: Possible climatic consequences of man made global warming
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Operational water quality management: Beyond planning and design
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ISTITUTO SUPERIORE DI SANITA, ROME (ITALY).
The nucleon exchange mechanism in composite nuclei interaction
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Special activity utilization of GDSCC antennas during 1981 N82-20129
Maintenance and operations tasks accomplished at DSS 12 during the antenna panel replacement downtime N82-20130

JRS INDUSTRIES, INC., SAN DIEGO, CALIF.
Study and experimentation of horizontal microprocessor machine description techniques
[AD-A109136] N82-19860

K

KAISERSLAUTERN UNIV. (WEST GERMANY).
Algorithm for the calculation of the largest integer in the quare root of a natural number
[PREPRINT-11] N82-19918

KAMAN AEROSPACE CORP., BLOOMFIELD, CONN.
Development of manufacturing technology for fabrication of a composite helicopter main rotor spar by tubular braiding
[AD-A109377] N82-19209
Structural system identification technology verification
[AD-A109181] N82-19583

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
A vortex-filament and core model for wings with edge vortex separation
[NASA-CR-165847] N82-19168
Dielectric properties of snow
[NASA-CR-166764] N82-19638
Active microwave investigation of snowpacks: Experimental documentation, Colorado 1979-1980
[NASA-CR-166727] N82-19646

KENTRON INTERNATIONAL, INC., HAMPTON, VA.
A computer program for wing subsonic aerodynamic performance estimates including attainable thrust and vortex lift effects
[NASA-CR-3515] N82-19151

KIRUNA GEOPHYSICAL INST. (SWEDEN).
Studies of the stratospheric and mesospheric wind system and temperature distribution from observations of infrasonic waves generated during regular Concorde flights
[KGI-176] N82-19789

KOBENHAVNS AMTS SYGEHUS I GENTOFTE, HELLERUP (DENMARK).
Cerebral hemodynamics at zero gravity N82-19827

KOBENHAVNS AMTS SYGEHUS I GLOSTRUP (DENMARK).
Clinical physiology of the renin-angiotensin-aldosterone system N82-19820

KOMMUNE HOSPITAL, COPENHAGEN (DENMARK).
Cardiovascular reflexes during upright position N82-19821

L

LABORATORY FOR ELECTRONIC DEVELOPMENT OF THE ARMED FORCES, OEGSTGEEST (NETHERLANDS).
MICAD: An interactive computer for the design of microwave circuits
[LEOK-TR-1980-06] N82-19473

LEHIGH UNIV., BETHLEHEM, PA.
Surface reactions and fatigue crack growth
[AD-A109296] N82-19588

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Millstone hill radar satellite tracking system
[AD-A109279] N82-19252
Multi-dimensional signal-processing research program
[AD-A108641] N82-19429
Seismic discrimination
[AD-A109184] N82-19739
Accuracy of parameter estimates for closely spaced optical targets using multiple detectors
[AD-A109185] N82-19978

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
An assessment of the crash fire hazard of liquid hydrogen fueled aircraft
[NASA-CR-165526] N82-19196

LOCKHEED-CALIFORNIA CO., BURBANK.
Electric flight systems, overview N82-19135

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.
Wheat stress indicator model, Crop Condition Assessment Division (CCAD) data base interface driver, user's manual
[E82-10031] N82-19607
AgRISTARS: Interim catalog ground data summary, data acquisition year 1979
[E82-10032] N82-19608
Recommended data sets, corn segments and spring wheat segments, for use in program development
[E82-10034] N82-19610
AgRISTARS: Early warning and crop condition assessment. Patch image processor user's manual
[E82-10055] N82-19630
AgRISTARS: Foreign commodity production forecasting. Corn/soybean decision logic development and testing
[E82-10056] N82-19631
Agricultural soil moisture experiment, Colby, Kansas 1978: Measured and predicted hydrological properties of the soil
[E82-10057] N82-19632
Preliminary evaluation of spectral, normal and meteorological crop stage estimation approaches
[E82-10059] N82-19634

Segment-level evaluation of the simulated aggregation test: US corn and soybean exploratory experiment
[E82-10061] N82-19636

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Manufacturing in space: Fluid dynamics numerical analysis
[NASA-CR-168610] N82-19236
Structural dynamic analysis of the Space Shuttle Main Engine
[NASA-CR-161945] N82-19302

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Underwater shock analysis of nonlinear structures, a reference manual for the USA-STAGS code, version 3
[AD-A108911] N82-19584

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
Offset wrap rib antenna concept development N82-19259

LODZ UNIV. (POLAND).
Certain aspects of primary cosmic rays composition at energies of 10 to the 14th power to 10 to the 15th power eV N82-20074

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Continental scientific drilling program curatorial needs
[LA-8726-MS] N82-19643
Los Alamos Scientific Laboratory computer benchmark performance 1979
[LA-8689-MS] N82-19849
COVFILS: A 30-group covariance library based on ENDF/B-V
[LA-8733-MS] N82-19873
Natural repository analogue program
[LA-8743-PR] N82-19970
Supernova hydrodynamics N82-20057
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

LOUGHBOROUGH UNIV. OF TECHNOLOGY (ENGLAND).
The use of a nonquadratic model in a conjugate gradient method of optimization with inexact line searches
[MATHS-RES-157] N82-19885
On Pythagorean triangles and coprime lattice points
[MATHS-RES-154] N82-19919
A variable metric method using a non-quadratic model
[MATHS-RES-158] N82-19920
A K-sample extension of Tukey's 2-sample quick test
[MATHS-RES-159] N82-19933
An experimental study of the effects of an inlet flow conditioner on the noise of a low speed axial flow fan
[TT-8101] N82-19956

LOUISIANA STATE UNIV., BATON ROUGE.
Prediction of surf zone characteristics
[AD-A108759] N82-19804

M

MARKET FACTS, INC., ARLINGTON, VA.
Consumer behavior towards fuel efficient vehicles. Volume 1: Executive summary
[PB82-103300] N82-20027

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Near field testing of LARC multiple beam antenna N82-19273
Conceptual design of electrostatic antenna N82-19275

MARTIN MARIETTA CORP., DENVER, COLO.
Preliminary analytical results using surface current integration for predicting effects of surface pillows on RF performance N82-19266

MARYLAND UNIV., COLLEGE PARK.
Plasma lasers (a strong source of coherent radiation in astrophysics) N82-20041
Electron acceleration in magnetosonic shock fronts N82-20060
Comments on high Mach number magnetosonic shocks N82-20082

MARYLAND UNIV., SOLOMONS.
Estuarine community dynamics benthic program, Patuxent River Estuary, preliminary data report
[PB82-108689] N82-19806

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Additional results of a study of unsteady airfoil surface pressures and turbulent boundary layers
[AD-A108978] N82-19184
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Study of the magnetic phase dependence of the Ni-CO reaction rate
[AD-A108422] N82-19338
Grain-coarsening resistance and the stability of second-phase dispersions in rapidly solidified steels
[AD-A109152] N82-19364
Surface modification in control SiO2 fiber fracture
[AD-A108796] N82-19589
A pitch control system for large scale wind turbines
[FFA-TN-HU-2262-PT-6] N82-19695
GPRINT: A LISP pretty printer providing extensive user format-control mechanism
[AD-A109031] N82-19883
Rotationally symmetric operators for surface interpolation
[AD-A109032] N82-19916
Impurity and defect characterization in epitaxial GaAs, InP and the ternary and quaternary compound semiconductors
[AD-A109052] N82-19997
Plasma dynamics in the rapidly rotating magnetosphere of Jupiter N82-20045
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Formation of ion conics and lower hybrid acceleration in the suprauroral region N82-20075

MATHTECH, INC., PRINCETON, N. J.
Impediments to energy and materials recovery facilities for municipal solid waste
[PB82-102302] N82-19383

MAX-PLANCK-INSTITUT FUER AERONOMIE, KATLENBURG-LINDAU (WEST GERMANY).
On the existence of the ion tearing mode N82-20076
Wave heating and acceleration of solar wind ions by cyclotron resonance N82-20081
Acceleration of cosmic rays by shock waves N82-20086

MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
Spectral and temporal behavior of the X-ray binary stars Cgy X-1 in the hard X-ray domain
[MPI-PAE/EXTRATERR-166] N82-20091
The mass spectrum of stellar origin
[MPI-PAE-EXTRATERR-167] N82-20092

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Theoretical investigation of the flow of a supersonic free jet from a slit
[MPIS-25/1980] N82-19182
Singularities of the solution of the problem of a weakly perturbed supersonic free jet with rotational symmetry
[MPIS-6/1980] N82-19188
Investigation of a CaCl molecular jet by means of laser induced fluorescence
[MPIS-29/1980] N82-19337
Measurement of the differential scattering cross sections of electron excited sodium by argon
[MPIS-31/1980] N82-19349
Integral total collision and ionization cross sections for the interaction of excited He in the (2/super 1/S, 2/super 3/S) state with Ar in the thermal energy range
[MPIS-32/1980] N82-19350
Kinetic investigations of the reactions of UFG in the gaseous phase
[MPIS-1/1981] N82-19351
Thermally dissociated chlorine and bromine molecular jets
[MPIS-26/1980] N82-19963
Measurement of integral scattering cross sections of hydrogen atom-molecular systems in the subthermal range
[MPIS-5/1981] N82-19967

MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.
Subsonic panel method for the efficient analysis of multiple geometry perturbations
[NASA-CR-3528] N82-19180
The NASA standard 20 ampere hour nickel-cadmium battery manual
[NASA-CR-166700] N82-19680

MEASUREMENT CONCEPT CORP., ROME, N. Y.
Intelligence Processor Performance Analysis (IPPA)
[AD-A108794] N82-19855

MEMORIAL UNIV. OF NEWFOUNDLAND, ST. JOHNS.
Bondi accretion N82-20064

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
The European Airbus: A challenge to the American commercial aircraft industry
[MBB-UH-01-81-O] N82-19162
Experience during the development of the German-Japanese helicopter BK 117
[MBB-UD-318-81-O] N82-19210
Perspectives for Controlled Weapons Technology: Report of the 90th Helicopter Forum
[MBB-UA-532-80-O] N82-19211
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[MBB-FE-172/S/PUB/39-PT-1] N82-19228
Report on a study of the maintenance in readiness of on-ground spacecraft systems for operational application programs
[MBB-80-162/150] N82-19242
Galvanic charging in air and space flight
[MBB-BB-485-O] N82-19478
Surface layer orientation coordination for boundary layer calculations on general configurations
[MBB-FE-122/S/PUB/41] N82-19507
Joint Indian-German program on solar energy: Phase 2
[BMFT-FB-T-81-182] N82-19693
Improving communication in organization operation: Preparing communication resources in a large enterprise
[MBB-BB-499-81-O] N82-20010
Transfer of aerospace project management to the development of technical series production
[MBB-UR-482-81-O] N82-20011

MIAMI UNIV., FLA.
Investigations of medium wavelength magnetic anomalies in the Eastern Pacific using Magsat data
[E82-10047] N82-19622

MICHIGAN ENERGY AND RESOURCE RESEARCH ASSOCIATION, DETROIT.
Resourceful decisions: LANDSAT in Michigan
[E82-10037] N82-19601

MICHIGAN STATE UNIV., EAST LANSING.
Electron exchange between Bis (eta meson-6-Arene) Chromium (I) and Bis (eta meson-6-Arene) Chromium (0). Comparisons between experimental and calculated kinetics parameters
[AD-A109051] N82-19348

MICHIGAN UNIV., ANN ARBOR.
Time effects of low-amplitude shear modulus of cohesive soils N82-19386

MINISTRY OF DEFENCE, LONDON (ENGLAND).
The weathering of plastics materials in the tropics. 6: The further evaluation of a solar radiation concentrating device (EMMA) as a means of accelerating the weathering of plastics
[AD-A109385] N82-19376

MINNESOTA DEPT. OF TRANSPORTATION, ST. PAUL.
Water pollution from highways and urban areas: An annotated bibliography (supplement)
[PB82-113317] N82-19714

MINNESOTA UNIV., MINNEAPOLIS.
Percolation and conduction phenomena in disordered composite media N82-19331

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Application of remote sensing to state and regional problems
[E82-10033] N82-19609

Vegetative erosion control studies Tennessee-Tombigbee Waterway
[AD-A108318] N82-19708

MITRE CORP., BEDFORD, MASS.
Analysis of multipath interference for APATS
[AD-A108797] N82-19305
Analysis of the multipath environment for APATS testing
[AD-A109345] N82-19306
RIW workshop report
[AD-A108798] N82-19551
Trusted computer systems. Glossary
[AD-A108829] N82-19856
The Software Acquisition Resource Expenditure (SARE) methodology, data requirements and data utilization
[AD-A109372] N82-19879

MITRE CORP., MCLEAN, VA.
Active Beacon Collision Avoidance System (BCAS) logic performance during operational flight tests
[AD-A108893] N82-19203
A concept for a fuel efficient flight planning aid for general aviation
[NASA-CR-3533] N82-19217

MONTANA STATE UNIV., BOZEMAN.
The compressible laminar two-dimensional wake with arbitrary initial asymmetry
[AD-A109084] N82-19185

N

NAGOYA UNIV. (JAPAN).
Interstellar matter N82-20035
Observable properties of accretion disks N82-20063

NAJARIAN, THATCHER AND ASSOCIATES, CLOSTER, N.J.
Upper Chesapeake Bay salinity study
[PB82-116641] N82-19717

NARA WOMEN'S UNIV. (JAPAN).
Cardiovascular responses to isometric exercise in sitting and lying position N82-19823

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering: A continuing bibliography (supplement 143)
[NASA-SP-7037(143)] N82-19131
Bibliography of NASA published reports on general aviation, 1975 to 1981
[NASA-TM-83307] N82-19132
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 1: Executive Summary
[NASA-TM-84149] N82-19170
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 2: Operators' Views
[NASA-TM-84148] N82-19171
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 3: Aerodynamics and Structures Session
[NASA-TM-84147] N82-19172
NASA/HAA Advanced Rotorcraft Technology and Tilt Rotor Workshops. Volume 4: Flight Control Avionics Systems and Human Factors
[NASA-TM-84146] N82-19173
Student's experiment to fly on third Shuttle mission
[NASA-NEWS-RELEASE-82-27] N82-19232
Mission operation report. MLR flight equipment installed in the Orbiter cabin
[NASA-TM-84153] N82-19233
Columbia carries astronomy experiments on third test flight
[NASA-NEWS-RELEASE-82-29] N82-19298
Mission operation report. Space Shuttle program STS-3 launch
[NASA-TM-84154] N82-19301
Upper stage alternatives for the shuttle era
[NASA-TM-84137] N82-19303
Satellite Earth resources data, module U-3
[E82-10035] N82-19611
NASA Oceanic Processes Program, Fiscal Year 1981
[NASA-TM-84467] N82-19801
NASA Facts: Images of Saturn from Voyager 2
[NASA-NF-132/10-81] N82-20102

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Spanwise loading distribution and wake velocity surveys of a semi-span wing
[NASA-TM-84213] N82-19164
A numerical method for solving the Vlasov equation
[NASA-TM-81339] N82-19985

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
OAO-3 end of mission tests report
[NASA-TM-83824] N82-19288
A high resolution spectroscopic study of the v sub 2 band of hydrogen sulfide and the 1-0 band of hydrogen iodide
[NASA-TM-83852] N82-19336
Fresnel-region fields and antenna noise-temperature calculations for advanced microwave sounding units
[NASA-TM-83813] N82-19428
A comparison of unsupervised classification procedures on LANDSAT MSS data for an area of complex surface conditions in Basilicata, Southern Italy
[E82-10038] N82-19613
Studies related to Magsat
[E82-10050] N82-19625
The effect of finite field size on classification and atmospheric correction
[NASA-TM-83818] N82-19645
Assessment of the first radiances received from the VSSR Atmospheric Sounder (VAS) instrument
[NASA-TM-83827] N82-19730
Information theory lateral density distribution for Earth inferred from global gravity field
[NASA-TM-83825] N82-19731
VISSR Atmospheric Sounder (VAS) simulation experiment for a severe storm environment
[NASA-TM-83822] N82-19774
Predictability of the tropical atmosphere
[NASA-TM-83829] N82-19775
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[NASA-TM-82164] N82-19779
Monitoring tropical cyclone intensity using wind fields derived from short-interval satellite images
[NASA-TM-82162] N82-19780
Estimating ocean-air heat fluxes during cold air outbreaks by satellite
[NASA-TM-83854] N82-19781
Modeling the data systems role of the scientist (for the NEEDS Command and Control Task)
[NASA-TM-84028] N82-20012
Documentation for the machine-readable version of the catalogue of stars within 25 parsecs of the Sun
[NASA-TM-84039] N82-20088
Data announcement bulletin: The Ariel V SSI 3A X-ray Catalogue
[NASA-TM-84029] N82-20089
HEAO 1 measurements of the galactic ridge
[NASA-TM-83844] N82-20097
Astrophysical tests for radiative decay of neutrinos and fundamental physics implications
[NASA-TM-83873] N82-20098
The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio
[NASA-TM-83891] N82-20103
Evidence for solar wind control of Saturn radio emission
[NASA-TM-83889] N82-20104
Magnetic field measurements at Jupiter by Voyagers 1 and 2: Daily plots of 48 second averages
[NASA-TM-83864] N82-20105
Accretion disk coronae
[NASA-TM-83840] N82-20106
Extragalactic gamma radiation: Use of galaxy counts as a galactic tracer
[NASA-TM-83901] N82-20109
Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110
On the theory of Gamma Ray Amplification through Stimulated Annihilation Radiation (GRASAR)
[NASA-TM-83857] N82-20111
Goddard Contributions to the Workshop on Gamma Ray Transients
[NASA-TM-83816] N82-20112

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Electromechanical actuators N82-19148
Large Space Shuttle Flight Experiment N82-19285
AgRISTARS: Foreign commodity production forecasting. Minutes of the annual formal project manager's review, including preliminary technical review reports of FY80 experiments
[E82-10039] N82-19614

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Electric Flight Systems
[NASA-CP-2209] N82-19134
Digital flight controls N82-19149
Electric flight systems integration N82-19150
RAXJET: A computer program for predicting transonic, axisymmetric flow over nozzle afterbodies with supersonic jet exhausts
[NASA-TM-83235] N82-19175
Effects of installation of F101 DFE exhaust nozzles on the afterbody-nozzle characteristics of the F-14 airplane
[NASA-TM-83250] N82-19181
Simulator study of vortex encounters by a twin-engine, commercial, jet transport airplane
[NASA-TP-1966] N82-19225
Large Space Systems Technology, part 2, 1981
[NASA-CP-2215-PT-2] N82-19257
Summary of antenna technology development at the Langley Research Center N82-19262
Radio frequency verification tasks related to a multiple aperture reflector system N82-19264
Preliminary experimental test results using 35 GHz offset fed reflector simulating surface pillows and aperture cables N82-19265
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Measurement of losses of mesh membrane material for reflector applications with an S-band radiometer N82-19269
Electrostatic membrane antenna concept testing N82-19274
Bolt clampup relaxation in a graphite/epoxy laminate
[NASA-TM-83268] N82-19320
Effect of vacuum processing on outgassing within an orbiting molecular shield
[NASA-TP-1980] N82-19390
Historical perspectives on thermostructural research at the NACA Langley Aeronautical Laboratory from 1948 to 1958
[NASA-TM-83266] N82-19498
Effects of repetition rate and impulsiveness of simulated helicopter rotor noise on annoyance
[NASA-TP-1969] N82-19707
SAM 2 Measurements of the Polar Stratospheric Aerosol, volume 2. April 1979 to October 1979
[NASA-RP-1088-VOL-2] N82-19734
Wave spectra of a shoaling wave field: A comparison of experimental and simulated results
[NASA-TM-83211] N82-19800
User's guide to noise data acquisition and analysis programs for HP9845: Nicolet analyzers
[NASA-TM-83256] N82-19943
Aircraft noise prediction program theoretical manual, part 1
[NASA-TM-83199-PT-1] N82-19946
Aircraft noise prediction program theoretical manual, part 2
[NASA-TM-83199-PT-2] N82-19947
Preliminary analysis of accelerated space flight ionizing radiation testing
[NASA-TM-83209] N82-19969

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Engine technology N82-19145
Power systems N82-19146
Environmental control systems N82-19147
Dilution jet behavior in the turn section of a reverse flow combuster
[NASA-TM-82776] N82-19220
Performance of single-stage axial-flow transonic compressor with rotor and stator aspect ratios of 1.63 and 1.78, respectively, and with design pressure ratio of 1.82
[NASA-TP-1974] N82-19222

The aerospace technology laboratory (a perspective, then and now)
[NASA-TM-82754] N82-19229

NASA Redox cell stack shunt current, pumping power, and cell performance tradeoffs
[NASA-TM-82686] N82-19333

Tribological properties at 25 C of seven polyimide films bonded to 440 C high-temperature stainless steel
[NASA-TP-1944] N82-19373

Surface chemistry and wear behavior of single-crystal silicon carbide sliding against iron at temperatures to 1500 C in vacuum
[NASA-TP-1947] N82-19374

Effect of location in an array on heat transfer to a cylinder in crossflow
[NASA-TM-82797] N82-19493

Hydrodynamic and aerodynamic breakup of liquid sheets
[NASA-TM-82800] N82-19494

High-speed laser anemometer system for intrarotor flow mapping in turbomachinery
[NASA-TP-1663] N82-19521

Composite seal for turbomachinery
[NASA-CASE-LEW-12131-3] N82-19540

Experience with modified aerospace reliability and quality assurance method for wind turbines
[NASA-TM-82803] N82-19550

Phosphoric acid fuel cell technology status
[NASA-TM-82791] N82-19670

Mechanism and models for zinc metal morphology in alkaline media
[NASA-TM-82768] N82-19671

Performance and operational economics estimates for a coal gasification combined-cycle cogeneration powerplant
[NASA-TM-82729] N82-19672

Operational performance of the photovoltaic-powered grain mill and water pump at Tangaye, Upper Volta
[NASA-TM-82767] N82-19673

Effect of facility variation on the acoustic characteristics of three single stream nozzles
[NASA-TM-81635] N82-19944

Local and national impact of aerospace research and technology
[NASA-TM-82775] N82-20006

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Structural assembly demonstration experiment N82-19282

Solar Array Flight Experiment (SAFE) N82-19284

Propulsion system ignition overpressure for the Space Shuttle
[NASA-TM-82458] N82-19299

Environmental durability of electroplated black chromium
[NASA-TM-82454] N82-19357

Longwall Guidance and Control Development
[NASA-TM-82455] N82-19637

Characterization of ASEC BSR 2 ohm-cm silicon solar cells with dielectric wraparound contacts as a function of temperature and intensity
[NASA-TM-82456] N82-19668

Precise source location of the anomalous 1979 March 5 gamma ray transient
[NASA-TM-83884] N82-20110

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

A method for applying linear optimal control theory to the design of a regulator for a flexible aircraft
[NLR-TR-80032-U] N82-19212

The effect of visual information on the manual approach and landing
[NLR-TR-80055-U] N82-19836

Transition Electron Microscope (TEM) in-situ straining and bulk studies of the selection of glide systems in Face Centered Cubic (FFC) crystals
[NLR-TR-80041-U] N82-19998

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).

A study of liquid hydrogen cooled LO-2/LH-2 rocket combustor with slotted wall liner
[NAL-TR-679] N82-19314

Acoustic fatigue endurance test of USB flap structure models at elevated temperature
[NAL-TR-683] N82-19570

Aerodynamic noise generated by jet wing/flap interactions of the external USB configuration of STOL aircraft. Part 2: Full scale model experiment using FJR710 turbofan engine
[NAL-TR-687T-PT-2] N82-19945

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Configurational effects in the adsorption of HD on ZnO
[AD-A109368] N82-19341

NATIONAL CENTRE OF TRIBOLOGY, RISLEY (ENGLAND).

Molybdenum disulphide lubrication. A continuation survey: 1977/78
[ESA-TRIB-4] N82-19379

British Aerodynamics Group (BAE) solar-array drive mechanism: Life test, stripdown and optical encoder examination
[ESA-TRIB-2] N82-19483

Thermal vacuum real-life test of an Marconi Space and Defence Systems (MSDS) solar-array drive mechanism (MSDS 002). First four years of operation
[ESA-TRIB-3] N82-19484

Selected European Space Tribology Laboratory (ESTL) papers on ball bearings for satellites
[ESA-TRIB-1] N82-19547

Ion-plated lead as a film lubricant for bearings in vacuum N82-19548

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.

Solar-geophysical data number 443. Part 1: (Prompt reports). Data for June 1981, May 1981
[PB82-113853] N82-20107

Solar-geophysical data number 443. Part 2: (Comprehensive reports). Data for January 1981, December 1979
[PB82-113861] N82-20108

NATIONAL METEOROLOGICAL CENTER, WASHINGTON, D. C.

Climate Analysis Center Users Conference
[PB82-113325] N82-19793

NATIONAL OCEAN SURVEY, ROCKVILLE, MD.

United States Coast Pilot 2. Atlantic Coast: Cape Cod to Sandy Hook, 16th edition
[PB82-109505] N82-19204

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANN ARBOR, MICH.

Improved St. Clair River dynamics flow models and comparison analysis
[PB82-119272] N82-19657

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

Turbulence statistics for design of wind turbine generators
[PB82-112939] N82-19792

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.

Australian tropical cyclones Kerry and Rosa, February - March 1979
[PB82-114182] N82-19794

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

Urban traffic signal control for fuel economy. Part 2: Extension to small cars
[AD-A109393] N82-20025

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, WASHINGTON, D.C.

Direct broadcast satellites: Policies, prospects, and potential competition
[PB82-110164] N82-19446

Proposed techniques for adding FM broadcast stations in a major market, part 2
[PB82-114240] N82-19447

NATIONAL TRAINING AND OPERATIONAL TECHNOLOGY CENTER, CINCINNATI, OHIO.

Inorganic analyses in water quality control programs: Instructor's guide
[PB82-111378] N82-19353

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.

Nonauditory effects of high intensity noise on ground crews at a naval air station
[AD-A108996] N82-19834

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.

Asymptotic normality of autoregressive parameter estimates for mixed time series
[AD-A108781] N82-19929

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.

An evaluation of estimators for receiver detection probabilities and unknown signal population size
[AD-A109536] N82-19884

Computational advances in large-scale nonlinear optimization
[AD-A109528] N82-19917

SASS hardware architecture and development monitor
[AD-A109552] N82-20015

The Naval postgraduate school SECURE ARCHIVAL STORAGE SYSTEM. Part 2: Segment and process management implementation
[AD-A109553] N82-20016

NAVAL RESEARCH LAB., WASHINGTON, D. C.

Ranging and sychronization between nominally co-orbital satellites
[AD-A109272] N82-19289

Weak and strong ignition. 2: Sensitivity of the hydrogen-oxygen system
[AD-A108843] N82-19342

VLFACM program description and operational manual
[AD-A109003] N82-19434

Electron transmission through and reflection by an arbitrary set of square potential steps
[AD-A108630] N82-19474

Influence of velocity shear on the Rayleigh-Taylor instability
[AD-A108800] N82-19504

Best Available Technologies (BATs) for computer security
[AD-A109189] N82-19857

Spherical acoustic broadband receiver
[AD-A109273] N82-19949

Level shifts and inelastic electron scattering in dense plasmas
[AD-A108799] N82-19986

The cavity Q for ergodic eigenmodes
[AD-A109041] N82-19987

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.

Relative effects of a graphite fiber reinforced epoxy composite and nickel-aluminum bronze on a cathodic protection system in seawater
[AD-A109078] N82-19321

Foundations for computer simulation of a low pressure oil flooded single screw air compressor
[AD-A108230] N82-19391

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.

Acceleration of convergence of a vector sequence by reduced rank extrapolation
[AD-A108765] N82-19910

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.

Aerodynamic design manual for tactical weapons
[AD-A109180] N82-19290

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.

Parametric study of propellant crack combustion
[AD-A108769] N82-19381

Comments on the doubly asymptotic approxmation. 2: A simple approximation for cutoff velocity
[AD-A108926] N82-19911

NAVAL WEAPONS SUPPORT CENTER, CRANE, IND.

Results of continuous synchronous orbit testing of sealed nickel-cadmium cells
[NASA-CR-168564] N82-19678

NAVY EXPERIMENTAL DIVING UNIT, PANAMA CITY, FLA.

Cost analysis of NEDU's helium reclaimer
[AD-A108409] N82-19230

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.

Human factors in system development: Status and evaluation N82-19841

Human factors for the future: Trends and speculations N82-19845

NETWORK ANALYSIS CORP., VIENNA, VA.
National Airspace Data Interchange Network (NADIN) support of Remote Maintenance Monitoring System (RMMS)
[AD-A109125] N82-19160

NEW HAMPSHIRE UNIV., DURHAM.
Special applications of irreversible thermodynamics N82-20001

NEW MEXICO INST. OF MINING AND TECHNOLOGY, SOCORRO.
Supernova hydrodynamics N82-20057

NEW MEXICO STATE UNIV., LAS CRUCES.
Design calculation procedure for passive solar houses at Navy installations in regions with cold climate, volume 1
[AD-A108382] N82-19683
Design calculation procedure for passive solar houses at Navy installations in East Coast regions with temperate climate, volume 2
[AD-A108383] N82-19684
Design calculation procedure for passive solar houses at Navy installations in regions with warm, humid climate, volume 3
[AD-A108384] N82-19685
Design calculation procedure for passive solar houses at Navy installations in the Pacific Northwest, volume 4
[AD-A108385] N82-19686
Design calculation procedure for passive solar houses at Navy installations in warm California climates, volume 5
[AD-A108386] N82-19687
Standard constructions in Abelian group theory N82-19937

NEW MEXICO UNIV., ALBUQUERQUE.
Asphalt recycling technology: Literature review and research plan
[AD-A108199] N82-19392

NEW YORK STATE UNIV., ALBANY.
Integrated and spectral energetics of the GLAS general circulation model
[NASA-CR-166766] N82-19729

NEW YORK UNIV., WESTBURY.
The investigation of the propagation mechanism of pressure fluctuation in turbulent flow
[AD-A108498] N82-19502

NEWCASTLE-UPON-TYNE UNIV. (ENGLAND).
Chain and belt drives, a review N82-19556

NIELSEN ENGINEERING AND RESEARCH, INC., MOUNTAIN VIEW, CALIF.
Laminar flow transition: A large-eddy simulation approach
[NASA-CR-3518] N82-19499

NORTH CAROLINA STATE UNIV. AT RALEIGH.
The synthesis of biodegradable block copolymers containing amylose and polyester oligomeric blocks N82-19371
Free volume theory of diffusion into polymers. Part 1: Method of predicting activation energies of diffusion for gases into elastomers. Part 2: Diffusion of non-ionic dyes into semi-crystalline poly (ethylene terephthalate) films. Part 3: Relationship between glass-transition and dyeing-transition temperatures N82-19372

NORTHWESTERN UNIV., EVANSTON, ILL.
Electronically induced phase transformations
[AD-A108982] N82-19380

NORTHWICK PARK HOSPITAL, HARROW (ENGLAND).
Safety demonstration study on proposed biorack glove box
[ESA-CR(P)-1482] N82-19239

O

OAO CORP., BELTSVILLE, MD.
Microwave radiometric observations near 19.35, 92 and 183 GHz of precipitation in tropical storm Cora
[NASA-TM-82164] N82-19779

OBSERVATOIRE DE PARIS-MEUDON (FRANCE).
The tropospheric gas composition of Jupiter's north equatorial belt (NH3, PH3, CH3D, GeH4, H2O) and the Jovian D/H isotropic ratio
[NASA-TM-83891] N82-20103

ODENSE UNIV. (DENMARK).
On-line, real-time determinations of breath-to-breath gas exchange N82-19832

OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
La Recherche Aerospatiale, Bimonthly Bulletin number 1981-3, May - June 1981
[ESA-TT-714] N82-19152
Rolling up of vortex sheets from the edges of lifting surfaces N82-19153
Multivariable aircraft control by maneuver commands: An application to air to surface gunnery N82-19154
Strong matching method for computing transonic viscous flows including wakes and separations: Lifting airfoils N82-19155
Electrical ground testing of aircraft antistatic protection N82-19156
A subspace iteration algorithm for spinning structure vibration mode computation N82-19157
Induction driven transonic wind tunnel T2: Operation at room temperature and cryogenic adaptation N82-19158
Testing ventilated nozzle models with supersonic primary flow N82-19159
La Recherche Aerospatiale, Bi-monthly Bulletin number 1981-4, July - August 1981
[ESA-TT-722] N82-20131
Theoretical and experimental determination of a compressor transfer function N82-20132
Experimental determination of temperature/velocity probability density functions in a turbulent flame N82-20133
Aircraft infrared radiation modeling N82-20134
Simulation using computer-piloted point excitations of vibrations induced on a structure by an acoustic environment N82-20135
Reynolds stress equations modeling in a rotating reference system N82-20136
Two-step implicit schemes for the solution of a conservation equation N82-20137

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
European Scientific Notes, volume 35, number 11
[AD-A109387] N82-20138

OHIO STATE UNIV., COLUMBUS.
Ignition, combustion, detonation and heat addition to established flows
[AD-A108580] N82-19339
Sophisticated jammers and adaptive arrays
[AD-A109300] N82-19430
A simulation study to test the prediction of 1 deg times 1 deg mean gravity anomalies using least squares collocation from the GRAVSAT mission
[AD-A108867] N82-19735
Chemical and molecular biological aspects alkylhydrazine-induced carcinogenesis in human cells in vitro
[AD-A109088] N82-19833

OKLAHOMA STATE UNIV., STILLWATER.
Investigations of flowfields found in typical combustor geometries
[NASA-CR-168585] N82-19495

OKLAHOMA UNIV., NORMAN.
An experimental investigation of flow surrounding an airfoil with a jet exhausting from the lower surface
[NASA-CR-166131] N82-19133

OLD DOMINION UNIV., NORFOLK, VA.
Experimental study of delta wing leading-edge devices for drag reduction at high lift
[NASA-CR-165846] N82-19165

OXFORD UNIV. (ENGLAND).
Modulational instabilities in astrophysics N82-20036

P

PARIS VI UNIV. (FRANCE).
Research on the effects of hydrostatic pressure on the electronic states of impurities
[AD-A108403] N82-19503

PEDA CORP., PALO ALTO, CALIF.
Conservative supra-characteristics method for splitting the hyperbolic systems of gasdynamics for real and perfect gases
[NASA-CR-166307] N82-19904

PENNSYLVANIA DEPT. OF ENVIRONMENTAL RESOURCES, HARRISBURG.
Water resources data for Pennsylvania, water year 1980: Volume 2: Susquehanna and Potomac River Basins
[PB82-115908] N82-19662

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Application of an airfoil stall flutter computer prediction program to a three-dimensional wing: Prediction versus experiment
[NASA-CR-168586] N82-19169
An experimental study of the effect of tail configuration on the spinning characteristics of general aviation aircraft
[NASA-CR-168578] N82-19224
Angular momentum alignment in nozzle expansions of gas mixtures N82-19329
Delineation of soil temperature regimes from HCMM data
[E82-10042] N82-19617
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements
[E82-10048] N82-19623

PENNSYLVANIA UNIV., PHILADELPHIA.
Static and hydrodynamic studies of the conformation of adsorbed macromolecules at the solid/liquid interface N82-19488

PHILIPS LABS., BRIARCLIFF MANOR, NEW YORK.
Development of a novel laser material for miniaturized laser systems
[AD-A109129] N82-19533

PHOENIX CORP., MCLEAN, VA.
Improved definition of crustal anomalies for Magsat data
[E82-10051] N82-19626

PHYSICAL RESEARCH LAB., AHMEDABAD (INDIA).
The periodical management system
[PB82-116518] N82-20019

POLYTEC GESELLSCHAFT FUER MESS- UND REGELTECHNIK M.B.H. UND CO., WALDBRONN (WEST GERMANY).
Microprocessor aided control and signal processing system for a laser-two-focus velocimeter in turbomachinery research
[BMFT-FB-T-81-190] N82-19869

PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Tailored plasma sprayed MCrAlY coatings for aircraft gas turbine applications
[NASA-CR-165234] N82-19360

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
Potential propulsion considerations and study areas for all-electric aircraft N82-19137

PRINCETON UNIV., N. J.
OAO-C Copernicus operations report
[NASA-CR-166774] N82-19237
On the disruptive vaporization and burning of emulsified and multicomponent fuel droplets N82-19354
Comparison of the bioptimal curve for two robust estimates
[AD-A109132] N82-19909
Ideal MHD fluids N82-20040
Particle acceleration N82-20043

PRINCETON UNIV. OBSERVATORY, N. J.
OAO-3 end of mission tests report
[NASA-TM-83824] N82-19288

PRINS MAURITS LAB. TNO, RIJSWIJK (NETHERLANDS).
The DAEDUT/PMLTNO hybrid rocket motor facilities
[VTH-LR-321] N82-19315

PUBLIC TECHNOLOGY, INC., WASHINGTON, D. C.
Remote sensing procurement package: A management report for state and local governments
[E82-10052] N82-19627

PUERTO RICO UNIV., MAYAGUEZ.
Implementation of a postcracking model for finite element analysis of reinforced concrete
[AD-A108984] N82-19572

PURDUE UNIV., LAFAYETTE, IND.
Flutter and time response analyses of three degree of freedom airfoils in transonic flow
[AD-A108987] N82-19227
Determination of the combustion mechanisms of aluminized propellants
[AD-A109058] N82-19340
The optimal planning of computerized manufacturing systems
[PB82-110644] N82-19397
Overview of the CHiP computer
[AD-A109293] N82-19853
Programming processor interconnection structures
[AD-A109294] N82-19893

On a locally optimal procedure based on ranks for comparison of treatments with a control
[AD-A109283] N82-19928

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Stress pulsed reflection and tensile cracking in a one-dimensional bilinear material
[AD-A108833] N82-19581
RADIO TECHNICAL COMMISSION FOR AERONAUTICS, WASHINGTON, D. C.
FM broadcast interference related to airborne ILS, VOR and VHF communications
[RTCA/DO-176] N82-19419
Investigation of technical requirements N82-19420
Investigation of airborne VHF communication and navigation equipment N82-19421
Investigation of the effects of airborne installation factors on receiver interference N82-19422
FAA/FCC coordination procedures for FM broadcast stations N82-19423
RAND CORP., SANTA MONICA, CALIF.
The development of high-intensity negative ion sources and beams in the USSR
[AD-A108935] N82-19964
RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
A glossary of range terminology
[AD-A108894] N82-19250
Universal documentation system handbook. Supplement 2: Procedures for the electronic transmission and processing of level 1, 2, and 3 test requirements and support information
[AD-A108901] N82-19251
Instrumentation timing systems
[AD-A109005] N82-19523
RCA LABS., PRINCETON, N. J.
High-energy ion implantation for multigigabit-rate GaAs integrated circuits
[AD-A108777] N82-19965
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
The role of environment on time dependent crack growth
[AD-A109388] N82-19573
RESEARCH INST. OF NATIONAL DEFENCE, KARLSTAD (SWEDEN).
Human factors and the real world N82-19840
Work paradigms in human factors research N82-19844
RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Variations in propagation attenuation at the frequencies 11, 18 and 36 GHz
[FOA-A-30028-E2] N82-19438
Recognition of, and damages caused to a radar antenna by a carbon dioxide laser
[FOA-C-30244-E1] N82-19441
Microwave tubes. Literature study number 2 relating to the year 1980
[FOA-C-30247-E] N82-19479
Data communication for minicomputers
[FOA-C-30226-E2] N82-19867
IMIO: A routine library for image input/output files on DEC-10. Directions for use
[FOA-C-30228-E1] N82-19888
Detection of periodically fluctuating noise
[FOA-C-30223-E1] N82-19955
RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
A study of dislocation density and phase elongation as a function of deformation in sintered tungsten composites
[FOA-C-20428-D4] N82-19365
High energy propellants containing magnesium
[FOA-C-20432-D1] N82-19382
Human Factors in System Development: Experiences and Trends
[FOA-A-56003-H9] N82-19839
Comparison of some irregular methods for level plotting interpolation
[FOA-C-20433-D8] N82-19887
RICE UNIV., HOUSTON, TEX.
Phase perturbation measurements through a heated ionosphere
[NASA-CR-167550] N82-19406
ROCHESTER UNIV., N. Y.
On the synergistic effects of laser/phonon-stimulated processes: A master equation approach
[AD-A109025] N82-19531
ROCKWELL INTERNATIONAL CORP., CEDAR RAPIDS, IOWA.
Digital flight controls N82-19143
ROCKWELL INTERNATIONAL CORP., EL SEGUNDO, CALIF.
Evaluation of superplastic forming and co-diffusion bonding of Ti-6Al-4V titanium alloy expanded sandwich structures
[NASA-CR-165827] N82-19358
ROCKWELL INTERNATIONAL SCIENCE CENTER, THOUSAND OAKS, CALIF.
Study of near-threshold fatigue crack propagation in pipeline steels in high pressure environments
[NASA-CR-166295] N82-19388
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION, FORT COLLINS, COLO.
Social and Environmental Consequences of Natural Resources Policies with Special Emphasis on Biosphere Reserves
[PB82-113937] N82-19660
ROME UNIV. (ITALY).
Radiation processes in active galactic nuclei N82-20042
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
A criterion for the prediction of the recovery characteristics of spinning aircraft
[RAE-TN-AERO-2251] N82-19223
Geopotential harmonics of order 29, 30 and 31 from analysis of resonant orbits
[RAE-TR-81109] N82-19247
Table of space vehicles, 1958 - 1980
[RAE-TR-81095] N82-19254
An examination of stability criteria for iterative numerical schemes used in solving differential equations
[RAE-TR-81081] N82-19902
ROYAL DENTAL COLL., COPENHAGEN (DENMARK).
The etiology of facial pain as related to masticatory muscles N82-19828
ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
Detailed investigation of a time of flight neutron spectrometer
[TRITA-PFU-81-01] N82-19528
Large scale dynamics of long flexible cables towed through air
[KTH-AERO-TN-61] N82-19567
A nonlinear finite element analysis of rapid crack growth at large scale yielding
[TRITA-HFL-0027] N82-19594
Sensitivity of the fracture probability in a reactor vessel to variations in data
[TRITA-HFL-0028] N82-19595
On the influence of mean load on crack opening and fatigue crack growth in a ship hull plate steel
[TRITA-HFL-0029] N82-19596
Event study on pre-substorm phases and their relation to the energy coupling between solar wind and magnetosphere
[TRITA-EPP-81-04] N82-19741
Calculation of equivalent forces at nodes. Some examples in actual practice for calculations with the FEM method
[KTH-PUBL-212] N82-19921
On the uniform boundedness of a family of matrices and the applications to one-leg and linear multistep methods
[TRITA-NA-8101] N82-19938
An appendix to the paper Plasma Electron Temperature Determination in Low-Density Plasmas from the Helium I 3889 A and 5016 A Line Intensities
[TRITA-EPP-81-03] N82-19988
Scaling laws of the multicomponent cool plasma mantle
[TRITA-PFU-81-04] N82-19989
The new paradigm in cosmic plasma physics N82-20031
The Voyager 1 Saturn encounter and the cosmogonic shadow effect N82-20032
ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, AMSTERDAM.
Optical imaging instruments for the Land Application Satellite System, phase A study, volume 2
[REPT-60/1023-VOL-2] N82-19980
ROYAL NETHERLANDS AIRCRAFT FACTORIES FOKKER, SCHIPHOL-OOST.
Development of a breadboard cooler for infrared remote sensing payloads, phase 1
[FOK-RV-R-81-064] N82-19653
ROYAL OBSERVATORY, EDINBURGH (SCOTLAND).
The role of episodic bombardment in geophysics N82-20100
Spiral arms, comets and terrestrial catastrophism N82-20101
ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
A review of millimetre wave devices
[RSRE-MEMO-3372] N82-19465
RUHR UNIV., BOCHUM (WEST GERMANY).
Instabilities in inhomogeneous collision-free self-gravitating stellar systems N82-20077
Quasistatic evolution of preflare equilibria N82-20079

S

SAAB-SCANIA, LINKOPING (SWEDEN).
On the accuracy of thermal inertia mapping by infrared imagery
[SAAB-REPR-AE-10] N82-19656
SACLANT ASW RESEARCH CENTER, LA SPEZIA (ITALY).
The SACLANTCEN oceanographic data base. Volume 2: Access, interrogation and display
[AD-A109417] N82-19803
SAINT LOUIS UNIV., MO.
Catoptric X-ray optical system for use in laser-fusion diagnostics
[AD-A109037] N82-19532
SAN DIEGO STATE UNIV., CALIF.
Laboratory verification of blast-induced liquefaction mechanism
[AD-A109000] N82-19393
SCIENCE APPLICATIONS, INC., EL SEGUNDO, CALIF.
Performance Technology Program (PTP-S 2). Volume 9: Evaluation of reentry vehicle nosetip transition and heat transfer in the AEDC hyperballistics track G
[AD-A108848] N82-19505
SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
The techniques, magnitudes and opportunities for development of energy storage (UK)
[PB82-120858] N82-19698
SCIENTIFIC SERVICE, INC., REDWOOD CITY, CALIF.
A mobile stream diversion system for hazardous materials spills isolation
[PB82-109679] N82-19661
SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.
Spring and Fall measurements of European very low altitude volume scattering coefficients
[AD-A108879] N82-19787
SENER, S.A., MADRID (SPAIN).
Development of an Optical Scanning Mechanism Assembly (OSMA)
[PS-1450] N82-19981
SHEFFIELD UNIV. (ENGLAND).
On the control of cocurrent tubular chemical reactors
[RR-160] N82-19352
PSICON: A simulation package for the design of digitally controlled systems
[RR-162] N82-19890
A multivariable feedback control problem with application to strip base control for Sendzimir mills
[RR-153] N82-19898
The receding horizon principle for distributed systems
[RR-167] N82-19899
Asymptotic properties of unknown systems
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Norm bounds for linear systems using step response data
[RR-159] N82-19924

On the compensation of optimal system asymptotic root-loci
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Variable structure systems and system zeros
[RR-157] N82-19940
Expansion of linear and semi-linear systems and the Popov criterion
[RR-158] N82-19941
On optimal control of plasma confinement
[RR-155] N82-19990
Ward-Leonard characteristics from nonlinearly-controlled series motor drives
[RR-165] N82-20026

SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and vibration Digest, volume 13, no. 5
[AD-A099477] N82-19555
The Shock and Vibration Digest, volume 13, no. 1
[AD-A095594] N82-19558
The Shock and Vibration Digest, volume 13, no. 12
[AD-A109583] N82-19562
Vortex shedding from cylinders and the resulting unsteady forces and flow phenomena, part 2 N82-19564

SIEMENS A.G., ERLANGEN (WEST GERMANY).
Superconducting niobium-tin resonators
[BMFT-FB-T-81-188] N82-19480

SIEMENS A.G., MUNICH (WEST GERMANY).
Ga (As, P): N - LED's for monochromatic illumination
[BMFT-FB-T-81-198] N82-19482

SIGMA TAU STANDARDS CORP., TUSCALOOSA, ALA.
Lightweight hydrogen maser
[AD-A108628] N82-19530

SOCIETE ANONYME BELGE DE CONSTRUCTIONS AERONAUTIQUES, BRUSSELS (BELGIUM).
High performance Variable Conductance Heat Pipe (VCHP) follow-on development: Phase 2
[SABCA-JPM/LN/HO5/NO144-VOL-1] N82-19508
Follow-on development of small cryogenic heat pipes: Phase 2 report
[SABCA-JPM/LN/HO5/N11-VOL-2] N82-19509

SOCIETE POUR LE PERFECTIONNEMENT DES MATERIELS ET EQUIPEMENTS AEROSPATIAUX, TOULOUSE (FRANCE).
Definition study on multishakers for vibration testing
[SOPEMEA-ET-17004] N82-19526

SOLAREX CORP., ROCKVILLE, MD.
Design of mobile photovoltaic power systems: 0.5-3kW
[AD-A108889] N82-19688

SOUTH CAROLINA UNIV., COLUMBIA.
Stochastic convergence of randomly weighted sums N82-19901

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Laboratory evaluation of multiviscosity-grade engine oils in US Army diesel engines
[AD-A108890] N82-19375
Study of liquid slosh in the tracking and data relay satellite hydrazine tanks
[NASA-CR-166745] N82-19492

SPAR AEROSPACE PRODUCTS LTD., TORONTO (ONTARIO).
Study of a radar altimeter for the European remote sensing program. Volume 1: Executive summary
[SPAR-R.1090-ISSUE-A] N82-19652

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Market analysis of seismic security systems
[NASA-CR-168612] N82-19387
Compressed television transmission: A market survey
[NASA-CR-168614] N82-19410
The feasibility of miniaturizing the versatile portable speech prosthesis: A market survey of commercial products
[NASA-CR-168611] N82-19838
Techniques for automatic deduction
[AD-A108979] N82-19882

STADTWERKE BOCHOLT G.M.B.H., (WEST GERMANY).
Preliminary study on the supply of industrial water by advanced treatment of waste water discharged from a sewage treatment plant
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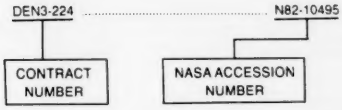

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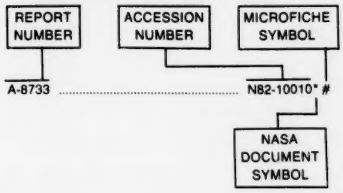

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AEDC-TSR-80-V60 ..... N82-19291 #

AEL-0039-TR ..... N82-19681 #

AERONOMICA-ACTA-A-236-1981 ..... N82-19722
AERONOMICA-ACTA-A-237-1981 ..... N82-19723*
AERONOMICA-ACTA-A-238-1981 ..... N82-19724
AERONOMICA-ACTA-A-240-1981 ..... N82-19767

AFESC/ESL-TR-81-42 ..... N82-19392 #

AFGL-ERP-743 ..... N82-19786 #

AFGL-TR-81-0153 ..... N82-19786 #
AFGL-TR-81-0199 ..... N82-19977 #
AFGL-TR-81-0201 ..... N82-19525 #
AFGL-TR-81-0237 ..... N82-19787 #
AFGL-TR-81-0252 ..... N82-19788 #
AFGL-TR-81-0302 ..... N82-19735 #
AFGL-TR-81-0304 ..... N82-19737 #
AFGL-TR-81-0325 ..... N82-19736 #

AFLRL-112 ..... N82-19375 #

AFOSR-81-0708TR ..... N82-19992 #
AFOSR-81-0759TR ..... N82-19502 #
AFOSR-81-0760TR ..... N82-19501 #
AFOSR-81-0776TR ..... N82-19338 #
AFOSR-81-0788TR ..... N82-19339 #
AFOSR-81-0798TR ..... N82-19878 #
AFOSR-81-0799TR ..... N82-19877 #
AFOSR-81-0834TR ..... N82-19524 #
AFOSR-81-0839TR ..... N82-19340 #
AFOSR-81-0840TR ..... N82-19347 #
AFOSR-81-0841TR ..... N82-19185 #
AFOSR-81-0842TR ..... N82-19578 #
AFOSR-81-0843TR ..... N82-19393 #
AFOSR-81-0848TR ..... N82-19184 #
AFOSR-81-0849TR ..... N82-19997 #
AFOSR-81-0853TR ..... N82-19882 #
AFOSR-81-0855TR ..... N82-19585 #
AFOSR-81-0856TR ..... N82-19587 #
AFOSR-81-0857TR ..... N82-19346 #
AFOSR-81-0858TR ..... N82-19318 #
AFOSR-81-0859TR ..... N82-19782 #
AFOSR-81-0860TR ..... N82-19362 #
AFOSR-81-0861TR ..... N82-19973 #
AFOSR-81-0863TR ..... N82-19582 #
AFOSR-81-0864TR ..... N82-19833 #
AFOSR-81-0865TR ..... N82-19532 #
AFOSR-81-0866TR ..... N82-19380 #
AFOSR-81-0867TR ..... N82-19506 #
AFOSR-81-0868TR ..... N82-19572 #

AFWAL-TM-81-133-FIBE ..... N82-19952 #

AFWAL-TR-81-3087 ..... N82-19951 #
AFWAL-TR-81-3103 ..... N82-19227 #

AGARD-AG-257 ..... N82-19571 #
AGARD-AG-265 ..... N82-19519 #
AGARD-AG-267 ..... N82-19747 #

AGARD-R-690 ..... N82-19328 #
AGARD-R-701 ..... N82-19600 #

AI-M-611 ..... N82-19883 #
AI-M-654 ..... N82-19916 #

AIAA-82-0192 ..... N82-19220* #

AMMRC-TR-81-37 ..... N82-19580 #

AMTE-N-TM-81903 ..... N82-19491

AR-001-672 ..... N82-19681 #
AR-002-223 ..... N82-19183 #
AR-002-280 ..... N82-19361
AR-002-640 ..... N82-19176 #

ARCSL-TR-81088 ..... N82-19433 #

ARL-TR-81-41 ..... N82-19408* #

ARL/AERO-NOTE-398 ..... N82-19183 #

ARL/AERO-TM-333 ..... N82-19859 #

ARL/MAT-NOTE-129 ..... N82-19361

ARL/MECH-ENG-REPT-158 ..... N82-19401

ARL/STRUC-NOTE-469 ..... N82-19199 #
ARL/STRUC-NOTE-471 ..... N82-19785 #
ARL/STRUC-NOTE-473 ..... N82-19161 #

ARLCB-TR-81044 ..... N82-19579 #

ARO-14932.8-E ..... N82-19574 #
ARO-15367.7-EL ..... N82-19953 #
ARO-15605.5-EL ..... N82-19993 #
ARO-15770.2-C ..... N82-19378 #
ARO-15878.3-P ..... N82-19994 #
ARO-15917.3-C ..... N82-19345 #
ARO-16370.5-MS ..... N82-19323 #
ARO-16669.12-M ..... N82-19909 #
ARO-18012.1-S-EL ..... N82-19860 #

ATC-R-92000/1CR-63 ..... N82-19322 #

ATR-81(7951)-3 ..... N82-19727* #

AVRADCOM-TR-81-F-9 ..... N82-19209 #

BAE-NUTDAM-11 ..... N82-19541

BAE-TP-7905 ..... N82-19649 #

BBC-RD-1981/9 ..... N82-19399
BBC-RD-1981/10 ..... N82-19400

BBN-4825 ..... N82-19432 #

BLL-RISLEY-TR-4385-(9091.9F) N82-19355

BLL-TRANS-1378-(9022.552) N82-19765
BLL-TRANS-1456-(9022.552) N82-19763
BLL-TRANS-1458-(9022.552) N82-19750
BLL-TRANS-1475-(9022.549) N82-19766
BLL-TRANS-1481-(9022.552) N82-19762
BLL-TRANS-1482-(9022.549) N82-19764
BLL-TRANS-1487-(9022.552) N82-19753
BLL-TRANS-1489-(9022.552) N82-19721
BLL-TRANS-1495-(9022.552) N82-19749
BLL-TRANS-1497-(9022.552) N82-19761
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BLL-TRANS-1502-(9022.552) N82-19760
BLL-TRANS-1503-(9022.552) N82-19759
BLL-TRANS-1505-(9022.552) N82-19757
BLL-TRANS-1506-(9022.552) N82-19757
BLL-TRANS-1509-(9022.552) N82-19756
BLL-TRANS-1510-(9022.552) N82-19758
BLL-TRANS-1511-(9022.552) N82-19754
BLL-TRANS-1514-(9022.552) N82-19752
BLL-TRANS-1521-(9022.552) N82-19751

BM-IC-8852 ..... N82-19663 #

BMFT-FB-T-80-028 ..... N82-19529 #
BMFT-FB-T-81-170 ..... N82-19982 #
BMFT-FB-T-81-173 ..... N82-19442 #
BMFT-FB-T-81-174 ..... N82-19690 #
BMFT-FB-T-81-180 ..... N82-19691 #
BMFT-FB-T-81-181 ..... N82-19692 #
BMFT-FB-T-81-182 ..... N82-19693 #
BMFT-FB-T-81-188 ..... N82-19480 #
BMFT-FB-T-81-189 ..... N82-19868 #
BMFT-FB-T-81-190 ..... N82-19869 #
BMFT-FB-T-81-191 ..... N82-19481 #
BMFT-FB-T-81-192 ..... N82-19366 #
BMFT-FB-T-81-197 ..... N82-19999 #
BMFT-FB-T-81-198 ..... N82-19482 #
BMFT-FB-T-81-200 ..... N82-19694 #
BMFT-FB-T-81-203 ..... N82-20000 #
BMFT-FB-T-81-204 ..... N82-19319 #
BMFT-FB-T-81-205 ..... N82-19709 #
BMFT-FB-W-81-026 ..... N82-19527 #
BMFT-FB-W-81-039 ..... N82-20099 #

BMO-TR-81-61-VOL-9 ..... N82-19505 #

BMVG-FBWT-81-11 ..... N82-19324 #
BMVG-FBWT-81-12 ..... N82-19983 #

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BR81084 ..... N82-19254
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BTS-FR-80-117 ..... N82-19644* #

BU-259 ..... N82-19214 #
BU-260 ..... N82-19597 #
BU-261 ..... N82-19191 #
BU-262 ..... N82-19215 #
BU-263 ..... N82-19231 #
BU-264 ..... N82-19192 #
BU-265 ..... N82-19216 #
BU-266 ..... N82-19193 #
BU-268 ..... N82-19194 #
BU-270 ..... N82-19327 #

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CEL-CR-82.002-VOL-1 ..... N82-19683 #
CEL-CR-82.003-VOL-2 ..... N82-19684 #
CEL-CR-82.004-VOL-3 ..... N82-19685 #
CEL-CR-82.005-VOL-4 ..... N82-19686 #
CEL-CR-82.006 ..... N82-19687 #

CERC-CETA-81-13 ..... N82-19881 #

CISE-1699 ..... N82-19368 #
CISE-1720 ..... N82-19485 #
CISE-1722 ..... N82-19512 #

CMU-CS-81-115 ..... N82-19880 #

CNES-85.55.00 ..... N82-19307 #

COO-4346-3 ..... N82-19477 #

CRC-TN-712-E ..... N82-19816 #

CRC-1347 ..... N82-19472 #
CRC-1349 ..... N82-19426 #
CRC-1352 ..... N82-19427 #

CRPE-NT-106 ..... N82-19870 #

CRREL-SR-81-27 ..... N82-19784 #

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CSIE-81-3 ..... N82-19846 #
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CTAMN/81/R/10 ..... N82-19805 #

CTH-MATH-1981-19 ..... N82-19939 #
CTH-MATH-1981-20 ..... N82-19922 #
CTH-MATH-1981-21 ..... N82-19923 #

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DE82-000397 ..... N82-19477 #

DFVLR-FB-81-30 ..... N82-19848 #
DFVLR-FB-81-35 ..... N82-19510 #

DFVLR-MITT-80-04 ..... N82-19219 #
DFVLR-MITT-81-16 ..... N82-19534 #
DFVLR-MITT-81-18 ..... N82-19957 #
DFVLR-MITT-81-20 ..... N82-19958 #
DFVLR-MITT-81-21 ..... N82-19297 #
DFVLR-MITT-81-22 ..... N82-19926 #
DFVLR-MITT-81-23 ..... N82-19892 #
DFVLR-MITT-81-28 ..... N82-19445 #

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DG-502-81 ..... N82-19250 #

DGLR-81-014 ..... N82-19507 #

DME-ME-249 ..... N82-20025 #

DMI-GEOPHIS-PAPERS-R-66 ..... N82-19742 #

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DNA-5738T ..... N82-19581 #

DOE/CS-50194/1 ..... N82-19542* #
DOE/CS-50194/1 ..... N82-19543* #
DOE/CS-50194/1 ..... N82-19544* #
DOE/CS-54209/6 ..... N82-19205* #

DOE/ET-37116/1 ..... N82-19674* #

DOE/EV-04346/T1 ..... N82-19477 #

DOE/JPL-1012-32 ..... N82-19676* #

DOE/NASA/0050-1 ..... N82-19669* #
DOE/NASA/12726-11 ..... N82-19333* #
DOE/NASA/17088-3 ..... N82-19670* #
DOE/NASA/20320-38 ..... N82-19550* #

DOE/SF-11552/1 ..... N82-19675* #

DOI/OMPRA-81/01 ..... N82-20021 #

DOT-HS-805936 ..... N82-20027 #

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DREV-R-4233/81 ..... N82-19974 #

DRIC-BR-80352 ..... N82-19376 #

DRIC-T-6468 ..... N82-19565
DRIC-T-6497 ..... N82-19490
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E-420-03-82-02 ..... N82-19233* #
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EDL-SRL-81-1 ..... N82-19525 #
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EPA-450/4-81-0058 ..... N82-20029 #
EPA-560/7-81-006 ..... N82-19835 #
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EPA-600/2-81-175-VOL-1 ..... N82-19711 #
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EPA-600/7-81-113 ..... N82-19715 #
EPA-600/7-81-114 ..... N82-19716 #

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ERADCOM/ASL-TR-0097 ..... N82-19975 #

ERIM-152400-7-T ..... N82-19635* #

ERL-0192-TR ..... N82-19802 #

ESA-BR-03 ..... N82-20020 #

ESA-CB(P)-1480-VOL-1 ..... N82-19979 #

ESA-CR(P)-1330 ..... N82-19379 #
ESA-CR(P)-1477 ..... N82-19954 #
ESA-CR(P)-1478 ..... N82-19649 #
ESA-CR(P)-1479 ..... N82-19805 #
ESA-CR(P)-1480-VOL-2 ..... N82-19980 #
ESA-CR(P)-1481-VOL-1 ..... N82-19292 #
ESA-CR(P)-1481-VOL-2A ..... N82-19293 #
ESA-CR(P)-1481-VOL-2B ..... N82-19294 #
ESA-CR(P)-1481-VOL-3 ..... N82-19295 #
ESA-CR(P)-1481-VOL-4 ..... N82-19296 #
ESA-CR(P)-1482 ..... N82-19239 #
ESA-CR(P)-1487 ..... N82-19240 #
ESA-CR(P)-1488 ..... N82-19886 #
ESA-CR(P)-1489 ..... N82-19313 #
ESA-CR(P)-1490 ..... N82-19981 #
ESA-CR(P)-1491 ..... N82-19307 #
ESA-CR(P)-1492-VOL-1 ..... N82-19650 #
ESA-CR(P)-1492-VOL-2 ..... N82-19651 #
ESA-CR(P)-1497-VOL-1 ..... N82-19508 #
ESA-CR(P)-1497-VOL-2 ..... N82-19509 #
ESA-CR(P)-1499 ..... N82-19526 #
ESA-CR(P)-1502 ..... N82-19652 #
ESA-CR(P)-1503 ..... N82-19439 #
ESA-CR(P)-1506 ..... N82-19653 #
ESA-CR(P)-1507 ..... N82-19654 #
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ESA-SPC(79)2 ..... N82-19246 #

ESA-TRIB-1 ..... N82-19547 #
ESA-TRIB-2 ..... N82-19483 #
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ESA-TT-714 ..... N82-19152 #
ESA-TT-722 ..... N82-20131 #
ESA-TT-726 ..... N82-19444 #
ESA-TT-745 ..... N82-19926 #
ESA-TT-750 ..... N82-19445 #

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ESD-TR-81-94 ..... N82-19429 #
ESD-TR-81-254 ..... N82-19306 #
ESD-TR-81-255 ..... N82-19305 #
ESD-TR-81-257 ..... N82-19551 #
ESD-TR-81-292 ..... N82-19978 #
ESD-TR-81-298 ..... N82-19252 #

ESL-713603-3 ..... N82-19430 #

ESN-35-11 ..... N82-20138 #

ESS/SS/1000 ..... N82-19313 #

EW-LO-00707 ..... N82-19630* #

EW-L1-00711 ..... N82-19607* #

E82-10031 ..... N82-19607* #
E82-10032 ..... N82-19608* #
E82-10033 ..... N82-19609* #
E82-10034 ..... N82-19610* #
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FAA-CT-81-15 ..... N82-19197 #
FAA-CT-81-209 ..... N82-19343 #

FAA-EM-81-11 ..... N82-19207 #

FAA-RD-80-138 ..... N82-19203 #
FAA-RD-81-60 ..... N82-19197 #
FAA-RD-81-109 ..... N82-19160 #

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FFA-TN-HU-2165 ..... N82-19599 #
FFA-TN-HU-2171 ..... N82-19590 #
FFA-TN-HU-2262-PT-6 ..... N82-19695 #

FHP-6-79 ..... N82-19405

FHWA/MN-81/3 ..... N82-19714 #

FOA-A-30028-E2 ..... N82-19438 #
FOA-A-56003-H9 ..... N82-19839 #

FOA-C-20428-D4 ..... N82-19365 #
FOA-C-20432-D1 ..... N82-19382 #
FOA-C-20433-D8 ..... N82-19887 #
FOA-C-30223-E1 ..... N82-19955 #
FOA-C-30226-E2 ..... N82-19867 #
FOA-C-30228-E1 ..... N82-19888 #
FOA-C-30244-E1 ..... N82-19441 #
FOA-C-30247-E ..... N82-19479 #

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FSGTR/RM-88 ..... N82-19660 #

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FTD-ID(RS)T-0708-81 ..... N82-19513 #
FTD-ID(RS)T-0861-81 ..... N82-19535 #
FTD-ID(RS)T-0927-81 ..... N82-19187 #
FTD-ID(RS)T-0939-81 ..... N82-19455 #
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FTD-ID(RS)T-1267-81 ..... N82-19476 #
FTD-ID(RS)T-1275-81 ..... N82-19475 #

FUB-9-1981 ..... N82-19486 #

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GIT-ICS-81/09 ..... N82-19864 #

GIT-ICS-81/11 ..... N82-19863 #
GIT-ICS-81/12 ..... N82-19862 #

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GPO-79-431 ..... N82-19201 #
GPO-80-995 ..... N82-19706 #
GPO-86-913 ..... N82-19234 #
GPO-89-008 ..... N82-19202 #
GPO-89-661 ..... N82-19300 #

G302-81-001 ..... N82-19566* #

H-REPT-97-271 ..... N82-19202 #

HDL-CR-81-100-1 ..... N82-19783 #

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IFSM-81-107 ..... N82-19588 #

IKE-1-11 ..... N82-19546 #
IKE-4-104 ..... N82-19889 #

INPE-2082-TDL/056 ..... N82-19850 #
INPE-2096-RPE/326 ..... N82-19851 #
INPE-2098-RPE/328 ..... N82-19895 #
INPE-2122-RPE/346 ..... N82-19726 #
INPE-2126-RPE/350 ..... N82-20096 #
INPE-2138-RPE/361 ..... N82-19316 #
INPE-2149-RPE/370 ..... N82-19467 #
INPE-2164-RPE/382 ..... N82-19412 #
INPE-2193-TDL/060 ..... N82-19703 #
INPE-2197-PRE/006 ..... N82-19639 #
INPE-2207-PRE/013 ..... N82-20023 #
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INPE-2209-MD/007 ..... N82-19642 #
INPE-2211-MD/008 ..... N82-19641 #
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INPE-2215-MD/010 ..... N82-19640 #
INPE-2222-PRE/018 ..... N82-19961 #
INPE-2224-PRE/020 ..... N82-19905 #
INPE-2229-PRE/021 ..... N82-19704 #
INPE-2232-TDL/063 ..... N82-19773 #
INPE-2233-TDL/064 ..... N82-19935 #
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